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ABSTRACT

Presented are 18 papers on predicting adolescent drug abuse. The papers have the following titles: "Current Issues in the Epidemiology of Drug Abuse as Related to Psychosocial Studies of Adolescent Drug Use"; "The Quest for Interpersonal Predictors of Marihuana Abuse in Adolescents"; "Assessing the Interpersonal Determinants of Adolescent Drug Use"; "Speculations on Possible Changes in Youthful Lifestyle between the 1960's and 1970's"; "A Psychological Approach toward the Meanings of Drug Use"; "An Approach to the Classification of the Lifestyles of Narcotic Abusers"; "Individualized Prediction as a Strategy for Discovering Demographic and Interpersonal/Psychological Correlates of Drug Resistance and Abuse"; "A Social Psychological Approach to Substance Abuse Construct Validity--Prediction of Adolescent Drug Use from Independent Data Sources"; "Computer Interview Questionnaires for Drug Use/Abuse"; "Personality Factors Related to Drug and Alcohol Use"; "Self-esteem as a Predictor of Adolescent Drug Abuse"; "Ego Mechanisms and Marihuana Usage"; "Chemical Substance Abuse and Perceived Locus of Control"; "Behavioral and Demographic Correlates of Drug Use among Students in Grades 7-12"; "Teenage Drug Use--A Search for Causes and Consequences"; "Predicting Time of Onset of Marihuana Use--A Developmental Study of High School Youth"; "Drug Use Research Items Pertaining to Personality and Interpersonal Relations--A Working Paper for Research Investigators"; and "Some Comments on the Relationship of Selected Criteria Variables to Adolescent Illicit Drug Use". (DB)

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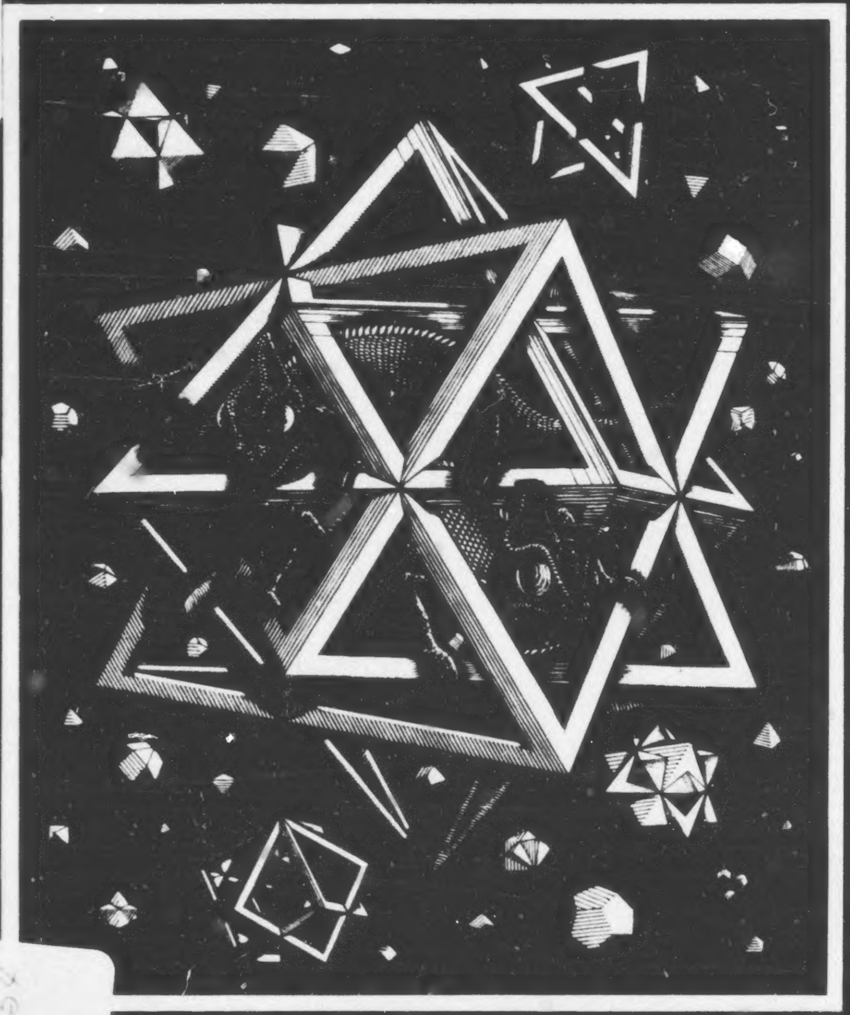
RESEARCH ISSUES 11

Predicting Adolescent Drug Abuse: A Review of Issues, Methods and Correlates



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NATIONAL INSTITUTE ON DRUG ABUSE

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9. Drug Themes in Science Fiction
10. Drug Themes in Fiction
11. Predicting Adolescent Drug Abuse: A Review of Issues, Methods, and Correlates

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PREDICTING ADOLESCENT DRUG ABUSE:

A Review of Issues, Methods and Correlates

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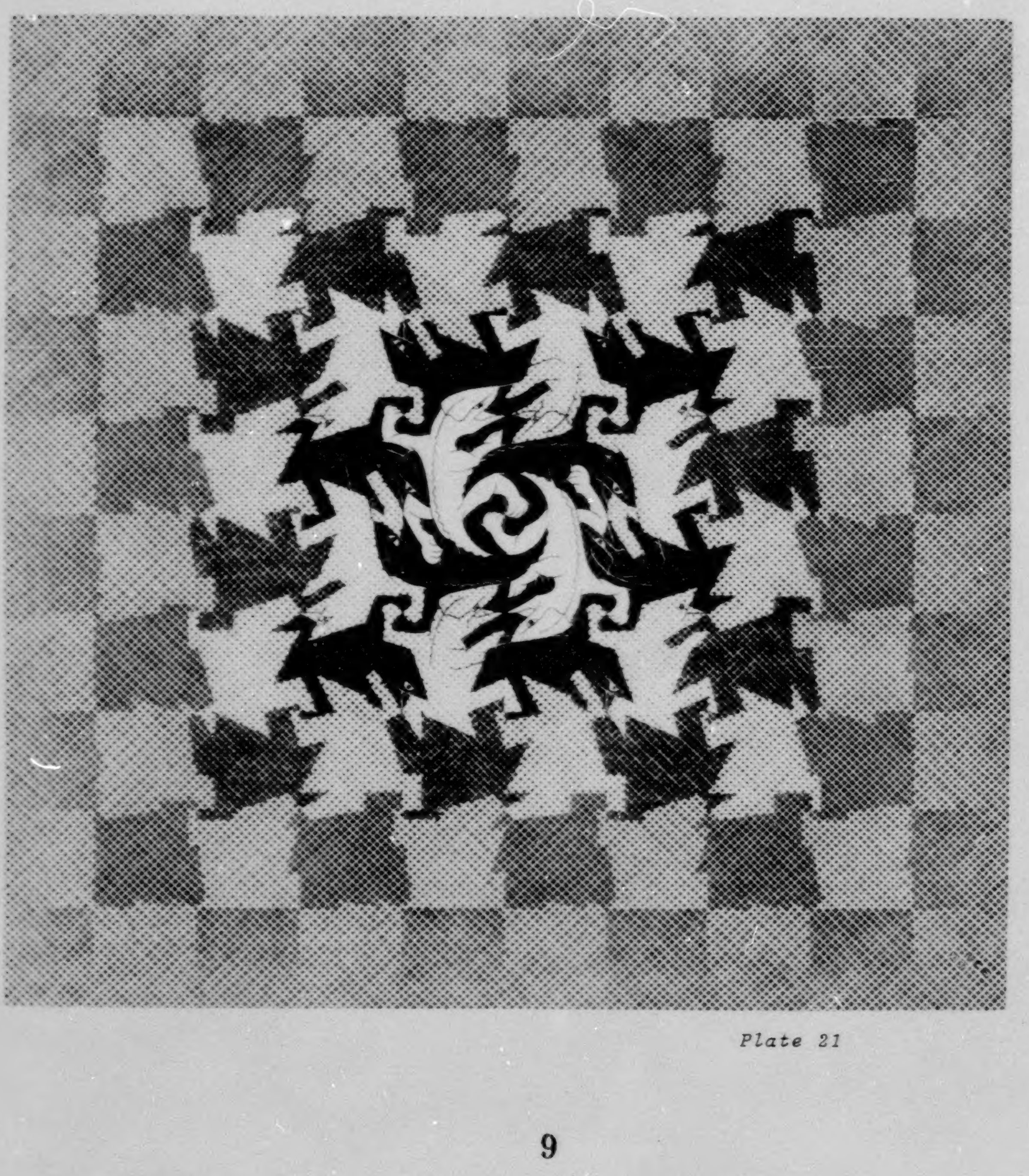

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PREDICTION: A PROLEGOMENON

DAN J. LETTIERI, Ph.D

National Institute On Drug Abuse

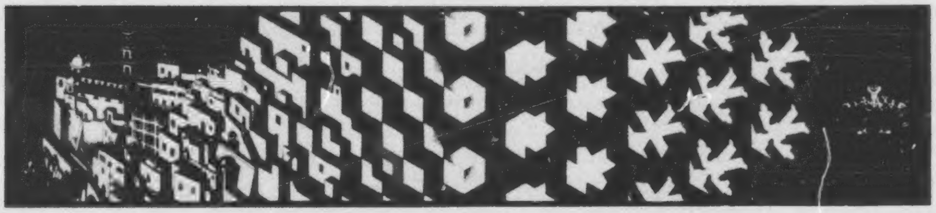

Plate 2

This current volume comprises some of the most recent thinking on the problems and intricacies surrounding the prospect of predicting drug-abusing behaviors. In particular, the bulk of the papers have focused on those aspects of prediction that relate specifically to adolescent drug abuse; consequently much of the discussion is about marihuana use.

The volume is organized into several domains: general conceptual issues, nosological approaches and clinical approaches; methodological strategies; intrapersonal, behavioral and interpersonal variables and correlates; longitudinal designs; and developmental models. What still remains undone is the development of a simple empirically weighted predictive instrument that can make reliable predictions as to who will or will not engage in drug abuse behavior.

Prediction: A Working Definition

The word prediction may be generally understood as the estimation of one phenomenon from a knowledge of others to which it is related empirically. In this context, a prediction instrument is one that uses certain information (e.g., item scores, weights, etc.) applying to a person at one point in time in order to estimate the probability of his becoming or remaining drug-abusing at some later point in time.

There are at least eight concepts which should be considered for an introductory understanding of the notion of prediction and predictive instruments.

USES OF PREDICTIVE INSTRUMENTS

A prediction instrument can distinguish between different kinds of risks (e.g., occasional marihuana use vs. heroin overdose) and it can separate the low risk persons from the high risks. Such a tool may take several forms: a table showing risk groups, or a score or equation which gives individual probabilities of risk.

A prediction tool may also be used to estimate the risks of various kinds of drug-abusing phenomena that are genuinely in the future; for example, one may try to identify those adolescents with a high probability of becoming seriously drug-abusing when older so as to give them preventive treatment now. But such tools can also be used for persons whose drug abuse potential is already known, in order to estimate the expected risk on the basis of information applicable at an earlier stage, e.g., when to release a recurrently hospitalized drug overdoser. This latter type of prediction may well be used in research on the effectiveness of treatment. If persons given various treatments are classified according to the risks that would have been expected before the onset of treatment, a baseline is formed against which the outcomes of the treatments can be judged. The development of such a tool, properly called a base expectancy instrument, is in no way as facile as it may appear.

TIME-BOUND PREDICTION

In a very real sense, the concept of prediction should be understood in terms of time-bound prediction. Measures taken at time 1 are used to predict some phenomenon at a future time 2. Prediction is time-bound in the sense that the time at which the initial measurements are made (viz., time 1) reflect and capture a particular psycho-social state of the individual, and great care should be given to the choice of time at which such measures are initially taken.

For example, if one were interested in predicting the likelihood of continued drug abuse by an individual, it would seem sensible to have baseline measures (time 1) taken when the person was engaging in some drug-abusing behaviors, rather than when he was sleeping. The time 1 measures should be taken at that point in time when it is conceivable that the individual could be engaging in the behavior to be predicted at time 2. In essence there should be some conceptual similarity of activity between time 1 and time 2 in terms of the potential for behavior(s) predicted (at time 2) to conceivably occur at time 1, although in fact such behavior may not have actually occurred yet at time 1. Similarly if one wished to predict the future likelihood that a youth would eventually engage in drug use, the researcher should take measures at time 1 only if it could be argued that the youth could conceivably have the psycho-social and psycho-motor readiness to engage in the behavior at time 1. One would not ordinarily wish to measure infants to predict future adult drug-using behaviors; obviously the disparities between the time 1 and 2 measures would be so great as likely to render the predictive effort futile.

TIME-LIMITED PREDICTION

The second issue, that of time-limited prediction, follows inferentially from the notion of time-bound prediction. The notion of time-limit refers to that interval between the initial, baseline measures (time 1) and the predicted outcome at time 2. The time interval can conceivably range from a few moments to eons. It must be recognized that the smaller the interval, the potentially greater will be the power and accuracy of the predictive tool. The quintessential issue rests with the degree of control over the amount of unforeseen, uncontrollable variation between time 1 and 2 which may affect, interact, and hence mollify the utility of the baseline measures. Intuitively an instrument which predicts that some behavior will or will not occur within the next ten minutes can conceivably achieve greater efficiency and power than a tool which attempts to predict the occurrence of some phenomenon in the very distant future. The concept of ceteris paribus is of critical relevance here. In most instances, practical requirements should force us into a choice of time limits, lest the researcher turn seer.

The researcher can attempt to specify in advance the time limits he wishes to impose. In most instances this should be based on empirical evidence. For example, if it is found statistically that most adolescents begin marihuana use at age 12, and that the overwhelming bulk fall within the onset range of ages 11-13, then the time 1 measures might be taken as early as age 9 and the predictive instrument might be specified as to its time limit at about five years; that is, time 1 measures taken at age 9 might hold for predictions relevant to adolescents up to age 14. The exact nature of the time limit could be carefully determined by examination of the standard deviations around the average age of first use. The more narrowly defined the time limit, the more the predictive efficiency will be enhanced.

In another sense, the notion of time limit implies something about the homogeneity of the groups under study. The more carefully one specifies the groups to be predicted as well as the time range of the prediction, the more likely it is that the predictive estimate will be on target.

HOMOGENEITY

Two recently developed methodologies (i.e., association analysis technique, predictive attribute analysis) stress that relationships between predictive cues or items and the criterion variable may vary greatly in a sample that is relatively heterogeneous; moreover it is recognized that the power and efficiency of a predictive instrument increases with decreases in the heterogeneity of the groups of persons about which predictions are to be made. Obviously an instrument is maximally efficient if it correctly predicts or classifies all persons into the appropriate categories under study. The state of the art of psychological prediction, however, is far from achieving such maximally efficient instruments.

It would seem that there are at least two important ways the researcher may adjust his predictive device to increase its homogeneity, or decrease its heterogeneity. The first is to take careful measures of individuals at time 1 when they are all in some comparable psycho-social state; a second way is to statistically control various kinds of subgroupings of persons on certain basic and relevant variables such as age, sex, drug-years-at-risk, etc. Thus, of the pool of persons under study, various subgroupings can be distilled such that within each of the subgroups homogeneity would be increased--in essence a type of gross within-group matching procedure.

SELECTIVE PREDICTION

It would follow that the process of increasing homogeneity within the sample essentially implies a kind of selective prediction model. Clearly, the researcher confronted with developing predictive instruments to apply to a broad, omnibus group, is perhaps best advised to develop a series or set of separate predictive instruments, each highly selective and pertinent to carefully delineated, selective and homogeneous subgroups.

CRITERION VARIABLE

As has been noted, prediction instruments are best made for defined classes of persons. The more delimited, and hence homogeneous the group under study, the more likely the increased efficiency of the instrument. This notion applies, in a wider respect, to the criterion variable as well. An instrument which aims at predicting future drug-abusing behavior of general sorts will most probably be less efficient and accurate than one which has a more focused, highly specific criterion of drug behavior.

Doubtless, there is a vast difference between predictions about general drug use, as opposed to more delimited predictions about a specific type of drug use, say use of heroin intravenously.

It has recently been suggested that the mode of drug administration is a variable of great importance. In fact, it has been argued that many drug users may find it relatively easy to smoke any of a variety of substances but most will stop short of actual intravenous use. The intravenous mode requires the users to cross a psychological/behavioral threshold. The point of these remarks is that one should attempt to specify exactly what one wishes to predict. For instance, it would be insufficient to predict marihuana use; rather one might specify "moderate use of marihuana by smoking."

It is not at all unreasonable to contend that scales developed to predict moderate use of marihuana by smoke inhalation might be very different in content and applicability from those designed to predict heavy use of marihuana taken intravenously.

LENGTH AND SCOPE OF PREDICTIVE INSTRUMENTS

It has often been assumed that clinical judgment will become more accurate the more relevant information there is. The research findings however do not support this, and in fact, most studies of clinical prediction have not shown a positive relationship between a judge's predictive accuracy and the amount of information available to him. (See Goldberg, 1968 for a review.) Thus, it would appear that there is little support for the belief that vast amounts of information or very long predictive instruments will, in the long run, be any more efficient predictors than concise and germane predictive tools. In fact, if two measurements vary closely together, one of them is probably unnecessary; it can contribute little to the information provided by the other. What is worse, by employing measurements that are highly correlated (redundant) together into a predictive scheme, one measurement is being used twice, thus potentially giving it an importance which is twice what it should be. The selection and combination of predictive items may be done by a variety of methods ranging from the simple adding up of points for "good" and "bad" factors to more complex methods (e.g., stepwise discriminant function analysis) that take account not only of the association of each factor with the criterion but also of the relationships between the factors themselves. The utilitarian feature of discriminant function analysis is that it affords a means of selecting from a large number of items those which have the most predictive value, and of combining these with the aim of making the combination a more powerful predictor than any of the individual items alone. The stepwise discriminant function, an elegant version of multiple regression analysis, systematically and in stepwise fashion seeks only the most pertinent, discriminating items for inclusion in the final scale and discards the redundant items.

INSTRUMENT VALIDATION

Once a scale is developed on one sample it is highly desirable to measure the scale's robustness, or conversely its shrinkage when it is tested on another comparable but separate sample. For practical reasons validation of a scale on a completely different sample is difficult and time-consuming. An alternative mode of validation is to develop the scale on part of the total sample and test it out for shrinkage on the remainder of the sample. Although such a procedure may tend to slightly underestimate shrinkage, the practical advantages clearly mitigate for its use.

Goldberg, L.R. Simple models or simple processes? Some research on clinical judgments. *American Psychologist,* 1968, *23*, 483-496.

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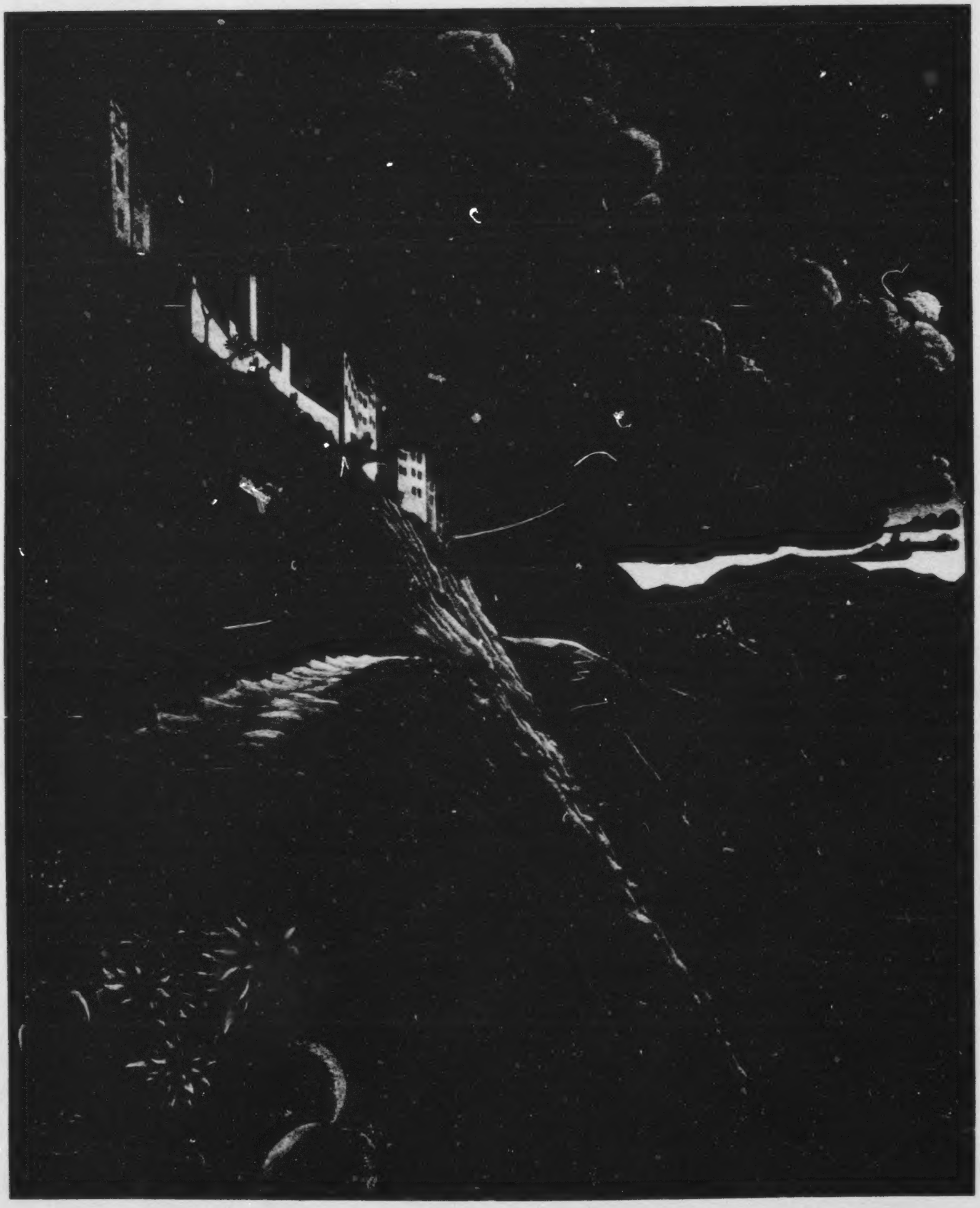

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SUMMARIES OF CHAPTERS

CONCEPTUAL ISSUES

EICHBERG & BENTLER:

Developing a set of potentially heuristic items to predict drug use is discussed in terms of current issues in the epidemiology of drug abuse. The utility of predictive research is explored in view of the multidimensional complexities in the drug field. The problem areas of defining terms, deciding the type of predictions desired, selecting relevant target populations, being cognizant of fads, and keeping in mind a variety of data sources which might be necessary to complete a prediction equation are discussed. Demographic variables which are relevant to predicting drug use are briefly reviewed. Additionally, the feasibility and nature of future collaborative research efforts are discussed in relation to the importance of interpreting data regarding social trends and dynamics of the populations being studied.

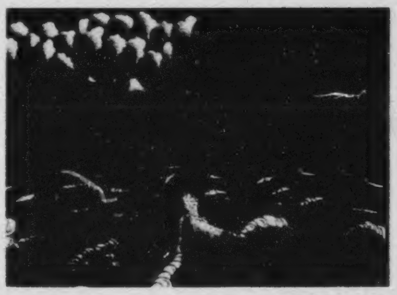
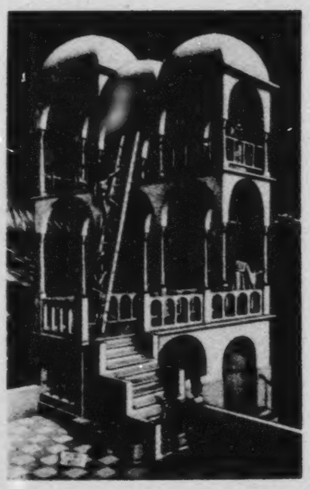


Plate 4

FISHER:

The Hopkins Symptom Check List, the TYS, and a Marihuana Attitude Scale based on the Osgood Semantic-Differential each would seem worthy of inclusion in any collaborative endeavor which attempts to find accurate predictors of subsequent marihuana abuse. Yet, there will undoubtedly be many other scales proposed by others covering similar behavioral areas, and some of these others might have more in their favor than the ones suggested.

What should be emphasized, however, is the deep conviction that the major problems facing the researcher who seeks predictors of marihuana abuse are not so much in the area of selecting appropriate predictors as in the selection of meaningful and feasible criteria of abuse. If a prediction may be made without abusing the reader's patience, it is expected that the eventual worth of any collaborative quest will hinge on how successfully the logical problems of interpreting obtained relationships between predictors and criteria can be solved.



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GOLDSTEIN:

The nature of items on model surveys of adolescent drug usage is discussed in the framework of a person-situation interactionist view of use causation. If drug effects are dependent upon the setting of use, then an assessment of the social norms of the respondent's salient reference groups should be valuable. Usage conceptualized as a dynamic pattern of a range of drugs and viewed according to the role which it plays in the life of the user will be most meaningful. A changing world means that assessments of usage must be periodically reconceptualized.

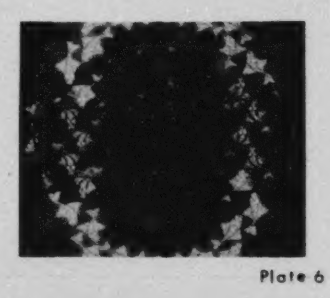

Plate 6

WINICK:

It is reasonable to assume that there are varying degrees of salience of drug use by young people and that the dimensions of life-style will also reflect a considerable range of salience for young people. The central thesis of this paper, however, is that there will be varying components of youthful life-style and that the last several years, and perhaps the next several years, are sufficiently different from the 1960's to require careful, item-by-item analysis of the ways in which we measure life-style, especially in terms of its relationship to drug use. This hypothesis, like any other assertion about trends in drug use, should be empirically tested so that we can determine the extent to which the "New Values" of the 1960's have been accepted in the present decade.

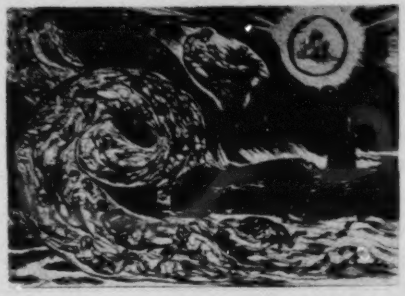

Plate 7

CLINICAL ISSUES

KOVACS:

An important psychological component of continued drug use is the way in which the user himself construes the drug effects. By asking individuals to describe what they are like both "on" and "off" drugs, it is possible to isolate dimensions on which each individual assesses the significance of drug use. It is proposed that the idiosyncratic utilitarian or instrumental value assigned to drugs greatly influences subsequent use or disuse. The implications of this conceptualization for treatment, rehabilitation, and empirical research are discussed.

Plate 8

NOSOLOGICAL ISSUES

NURCO *et al*:

This paper presents the conceptualization for a study of the life-styles of drug addicts. It proceeds from the premise that for a "deviant" individual the deviance itself and the pursuit of the means necessary to sustain the deviancy often become the central life interest or major social role. To the extent that drug taking has become an individual's central life interest, and in accordance with the manner in which he acquires the resources to obtain drugs and has an excess of resources over and above drug-taking needs, other life activities will be affected.

A questionnaire administered to 267 narcotic addicts included items intended to throw light on life activities, using them as dimensions of life-styles. Descriptions of these activities in the daily lives of eight subjects are included here as examples of the wide range of those activities in the life-styles of narcotic addicts.

Plate 9

METHODOLOGICAL ISSUES

DUNNETTE:

Classic psychometric theory has typically assumed that errors of measurement are randomly distributed across persons being measured and that errors of the same magnitude are essentially equivalent regardless of where they occur along the score distribution. Both assumptions are frequently wrong. Many researchers have shown that magnitudes of errors of measurement may differ in a stable manner from person to person. That is, persons have been shown to be differently predictable. Errors of the same size obviously also can have very different effects and very different associated costs, as, for example, in the contrasting costs of false positive or false negative errors in medical diagnosis. This paper argues strongly for placing more emphasis on nonlinear prediction models such as moderator analyses and configural or actuarial scoring in studies of drug related behavioral outcomes. The argument stems primarily from our survey of findings reported by many recent prediction studies of drug resistance/use/abuse. The findings yield a plethora of attitudinal, demographic, interpersonal, behavioral, and personality correlates of different types of drug related behavior. Gains in predictive and diagnostic accuracy can best be realized by developing several prediction systems shown empirically to be optimal for particular subgroups, particular developmental patterns, and particular behavioral outcomes.

Plate 10

BENTLER & EICHBERG:

Some metatheoretical and metaempirical issues in predictive drug abuse research are reviewed. The relation of ethics to research in this area, the importance of possible future applied uses of the research, the role of discriminant validation in prediction, and the relevance of research to public policy are considered. The criterion to be predicted is discussed in the context of decisions that need to be made with respect to its univariate or multivariate nature, the measurement of use vs. abuse, the possible role of variables correlated with use and the importance of operational definitions. Structural considerations related to the measurement of predictors are discussed as related to measures obtained by self-report, peer and parent report, behavior observation, performance testing, psychophysiological methods, archives, and sociological procedures. Principles of prediction relevant to the design of research in this area are reviewed. Finally, empirical drug research using independent peer and parent data sources is reviewed for its relevance to future predictive research.

Plate 11

GREIST *et al*:

With the advent of high speed digital computers, and the development of timesharing systems and interview construction and conduction programs, it became possible to collect information directly from subject respondents by computer interview. Computing costs have steadily decreased and have now reached a point where computer interviews are economically feasible for routine clinical and research applications.

Regardless of the content of items chosen to assess drug use/abuse and life-styles, the method of data collection can significantly influence the reliability and validity of the responses obtained. Computer interview questionnaires have several potential advantages for drug use/abuse/life-styles subject matter, and this paper reviews data supporting this position. With various socially deviant topics including drug use, most subjects preferred computer to physician interviews and especially favored them over paper-and-pencil questionnaires. Data obtained are at least as valid and reliable as that collected by humans and have had predictive utility. Statistical analyses are facilitated and human data transformations eliminated because data are immediately stored in computer processable form.

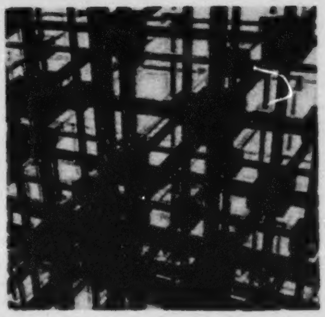

Plate 12

INTRAPERSONAL ISSUES

SEGAL:

The relationships between personality and environmental variables and drug and/or alcohol use or nonuse in young adults were considered in two manners as part of a larger study. First, the patterns of inner experiences such as daydreaming and imagery processes related to drug use, general personality characteristics, and other dimensions were explored. Second, a series of stepwise discrimination studies using a wide range of personality and imaginal process variables to discriminate between drug users and nonusers were performed.

The factor analytical techniques employed in the initial portion of the study indicated a moderate indulgence pattern across subcultural groups for the drug users. However, no specific pattern or trend emerged for the use of alcohol alone. The discriminate studies consistently demonstrated that the most significant discriminator relative to drug use was the Experience Seeking Scale of the Zuckerman SSS. Other variables, such as Disinhibition (SSS), also discriminated among the four criterion groups (drug users, nonusers, alcohol-only users, and marihuana-only users) but not as dramatically, although they too accurately predicted group membership.

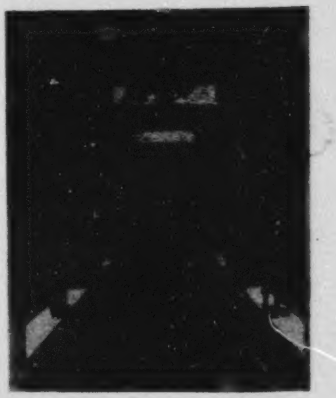

Plate 13

NOREM-HEBEISEN:

A six variable model is suggested as a tool to identify adolescents who are resistant or vulnerable to drug abuse. Variables in the model include availability of drugs, reinforcing valence of drug use, social support (peer and parental), value stance, coping skills, and psychological well-being. Self-esteem is proposed as a salient variable within the broader category of psychological well-being. The Self Assessment Scales are used as a measure of self-esteem in these studies. Items with significant differences ($p < .001$) between groups of drug abusers and a normal population of adolescents are combined into a single measure on which to categorize subjects as drug-abusing or normal. This measure provides effective classification only among the normal group and an in-treatment group of drug abusers. The multidimensional construct of self-esteem provides significant contrasts between normal and drug-abusing populations. The limited sampling among drug-abusing populations is a basis for urging further study before claiming low self-esteem as a contributor to drug abuse.

Plate 14

NADITCH:

The relationship between marihuana usage and ego mechanisms of coping and defense was examined. There was no evidence that subjects who used only marihuana or hashish had patterns of ego deficiency that have been associated with narcotic and alcohol addiction. Marihuana use was positively associated with characteristic use of regression in service of the ego. A discriminant function analysis of the difference between marihuana users and users of more potent illicit drugs found in the latter group evidence of ego deficiency, regressive tendencies, and low scores on total coping, as well as characteristic use of regression in service of the ego.

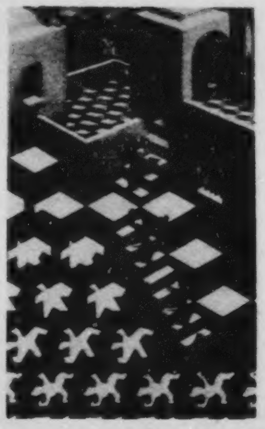

Plate 15

PLUMB *et al*:

In reviewing the massive and conflicting literature on locus of control, perhaps a resolution can be found in terms of a self-medication theory of drug abuse/addiction. This theoretical position conceptualizes the individual as seeking to alleviate some distressing affective state or otherwise to alter a world he dislikes; heroin may then be seen as the supermedication of them all, as evidenced by the fact that it often comes to be preferred to other drugs. Once he has medicated himself, the individual may be able to function reasonably well except for the problems of social disapproval and legal entanglement he encounters. Such conflicts may themselves perpetuate the need for medication but finally will create one or more crises which are insurmountable (e.g., the individual cannot obtain the needed supply; he is disowned by family; he is arrested). At that point the individual again feels distressed until his difficulties are resolved, perhaps through entering a treatment program which provides substitute medications and/or psychological supports. Under these circumstances, the individual may once more see himself as having some control over his reinforcements. All of the foregoing, of course, is highly speculative and rather forced. However, what is suggested is that the locus of control score of the drug user/abuser at a particular point in time may be a joint function of his generalized expectancy and of the adequacy with which his needs are met, whether through drugs or through other systems of support.

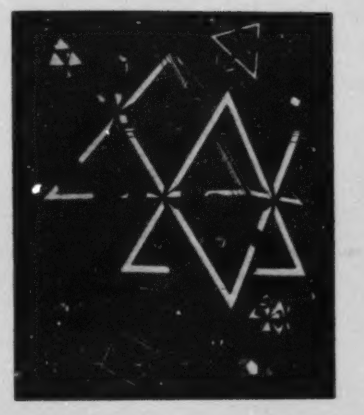

Plate 1

BEHAVIORAL/DEMOGRAPHIC ISSUES

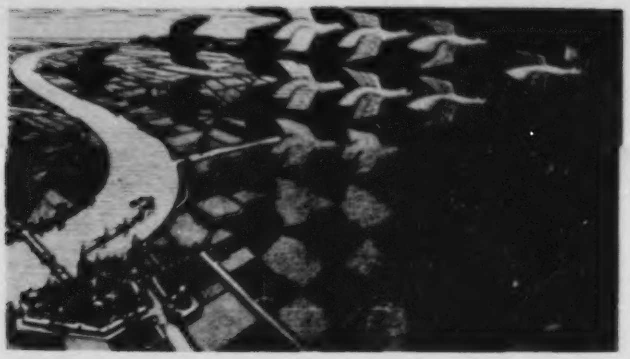

Plate 16

BLOCK:

The most important single factor contributing to an understanding of major differences between drug users appears to be the extent to which they us alcohol to get "high." The second most important factor seems to be the extent to which students between grades 7 and 12 smoke cigarettes. Ranking immediately after these factors one finds the use of beer, wine and hard liquor. These results are consistent with the original report. Indeed, analyses conducted after the original report and to be reported separately in a supplement to it suggest that while drug users are deviant from a drug-free population on these dimensions, users of marihuana and another drug are significantly more deviant in the same direction from those students who use marihuana only. Another important variable appears to be age since it entered the DFA relatively early and ranks relatively high in terms of the initial "F" contribution. On the other hand, analyses holding age constant within one year, performed subsequent to the original report, suggest that while this variable accounts for some of the variance, the essential behavioral and attitudinal differences between drug users and nonusers exist independently of age.

LONGITUDINAL ISSUES

SMITH & FOGG:

Membership in teenage groups, classified by self-report of drug use (222 nonusers, 216 marihuana users, and 104 hard drug users), was significantly predicted from nondrug variables measured four years prior to assessment of drug use. Information concerning predictor vairables was obtained from school records, self-report by students, and peer ratings. Compared with drug users, nonusers scored high on grade point average, low on cigarette smoking, and high on negative attitudes toward cigarette smoking. Regarding personality, the nonusers scored low on rebellious, untrustworthy, sociable, and impulsive, and scored high on hardworking, ambitious, self-reliant, orderly, likes school, feels accepted, feels capable, and feels confident academically.

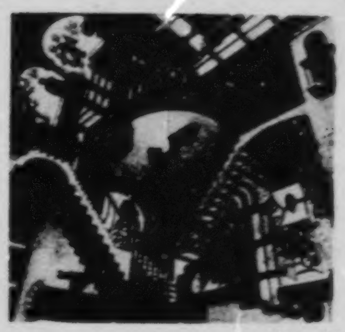

Plate 17

DEVELOPMENTAL ISSUES

JESSOR:

The aim of this report has been to assess the utility of a social psychology of problem behavior for predicting the onset of marihuana use. Onset and time of onset were shown to be systematically related to a social-psychological pattern of attributes defining a deviance or transition proneness. That pattern includes lower value on achievement and greater value on independence, greater social criticism, more tolerance of deviance, and less religiosity in the personality system; less parental control and support, greater friends' influence, and greater friends' models and approval for drug use in the perceived environment system; and more deviant behavior, less church attendance, and lower school achievement in the behavior system. The nonusers of marihuana tend to represent the opposite pattern, a pattern of relative conventionality or conformity.

Of special importance, the longitudinal data enabled the examination of the developmental trajectories of these theoretical attributes in relation to marihuana onset. It was quite clear that the course of adolescent development is significantly related to whether and to when marihuana onset occurs. Beginning to use marihuana leads to a developmental divergence from nonusers and a convergence upon the characteristics of those who are already users.

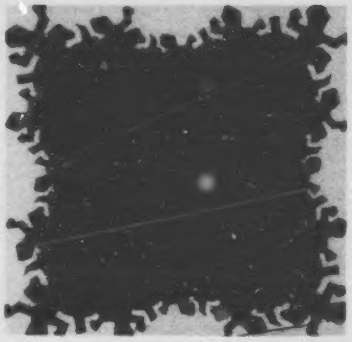

Plate 18

Finally, it was shown that marihuana onset is related to the prevalence of other problem or transition-marking behaviors such as sexual intercourse experience, problem drinking, or participation in activist protest. The conclusion to be drawn is that deviance or transition proneness is not specific to a given behavior but constitutes a more general developmental notion.

INTERPERSONAL ISSUES

MELLINGER *et al*:

Data for this paper come from a longitudinal study of a probability sample of men who entered the University of California (Berkeley) as freshmen in Fall 1970. A total of 834 men participated in both waves of the study: Fall 1970 and Spring 1973.

The study is interested in personality and interpersonal variables as possible consequences and concomitants, as well as precursors, of drug use. Responses to some of these variables at Time-1 also are predictive of which drug users reduce or escalate their levels of use by Time-2.

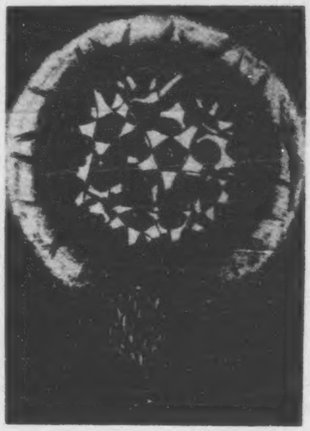

Plate 19

The data tend to support two seemingly contradictory hypotheses, i.e., that illicit drug use is associated with (1) emotional distress and also with (2) traits (such as creativity and openness to new experience) that may indicate high levels of ego development. The paper discusses why these hypotheses may not be as contradictory as they seem. Among the items reflecting emotional distress, those suggesting classic forms of neurosis (anxiety and depression) are less highly related to drug use than are items suggesting lack of ego integration, identity crisis, or the amotivational syndrome. The possibility is raised that responses suggesting lack of motivation may, in part, reflect acceptance of subcultural values associated with the "hang-loose" ethic.

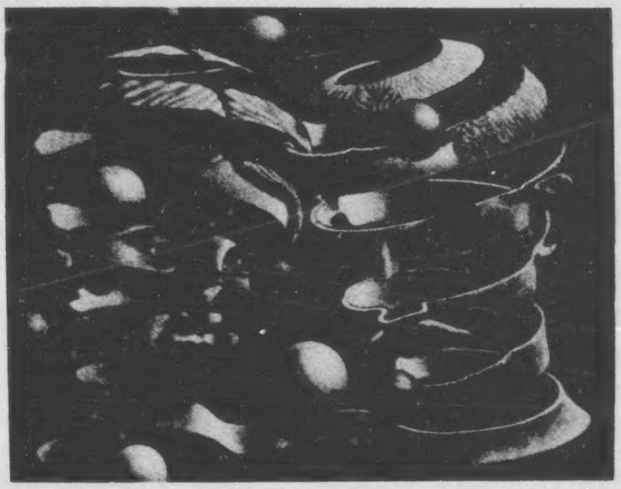

Plate 20

KANDEL:

There are similarities but also important contrasts in the pattern of association of various factors with adolescent illicit drug use depending upon whether or not marihuana or other illicit drugs are involved. Peer influence is much more important on marihuana use than on other illicit drug use. While peer behavior still shows the strongest effect of any variable in the probability of using other illicit drugs among those already initiated into marihuana use, other variables, such as depression and lack of closeness to parents, now assume almost as strong an importance. Longitudinal analyses are required to determine the extent to which these variables are determinants or consequences of use.

Cross-sectional and longitudinal analyses have documented that marihiuana use and the use of other illicit drugs represent but two later stages in a sequence of patterns of drug use which begins with the legal drugs: beer or wine, hard liquor or tobacco (Kandel & Faust, 1975). The identification of stages in drug behavior has important implications for studying the factors that predict, differentiate, or result from drug use. It draws attention to the fact that in each of the stages different types of variables and different processes may be involved. Furthermore, since each stage represents a cumulative pattern of drug use and generally contains fewer adolescents than the preceding stage in the sequence, comparisons should be made among users and nonusers of the restricted group of respondents who have already used the drug(s) at the preceding stage(s). Unless this is done, the attributes identified as apparent characteristics of a particular group of drug users may actually reflect characteristics important for involvement in drugs at the preceding stage.

CURRENT ISSUES IN THE EPIDEMIOLOGY OF DRUG ABUSE AS RELATED TO PSYCHOSOCIAL STUDIES OF ADOLESCENT DRUG USE

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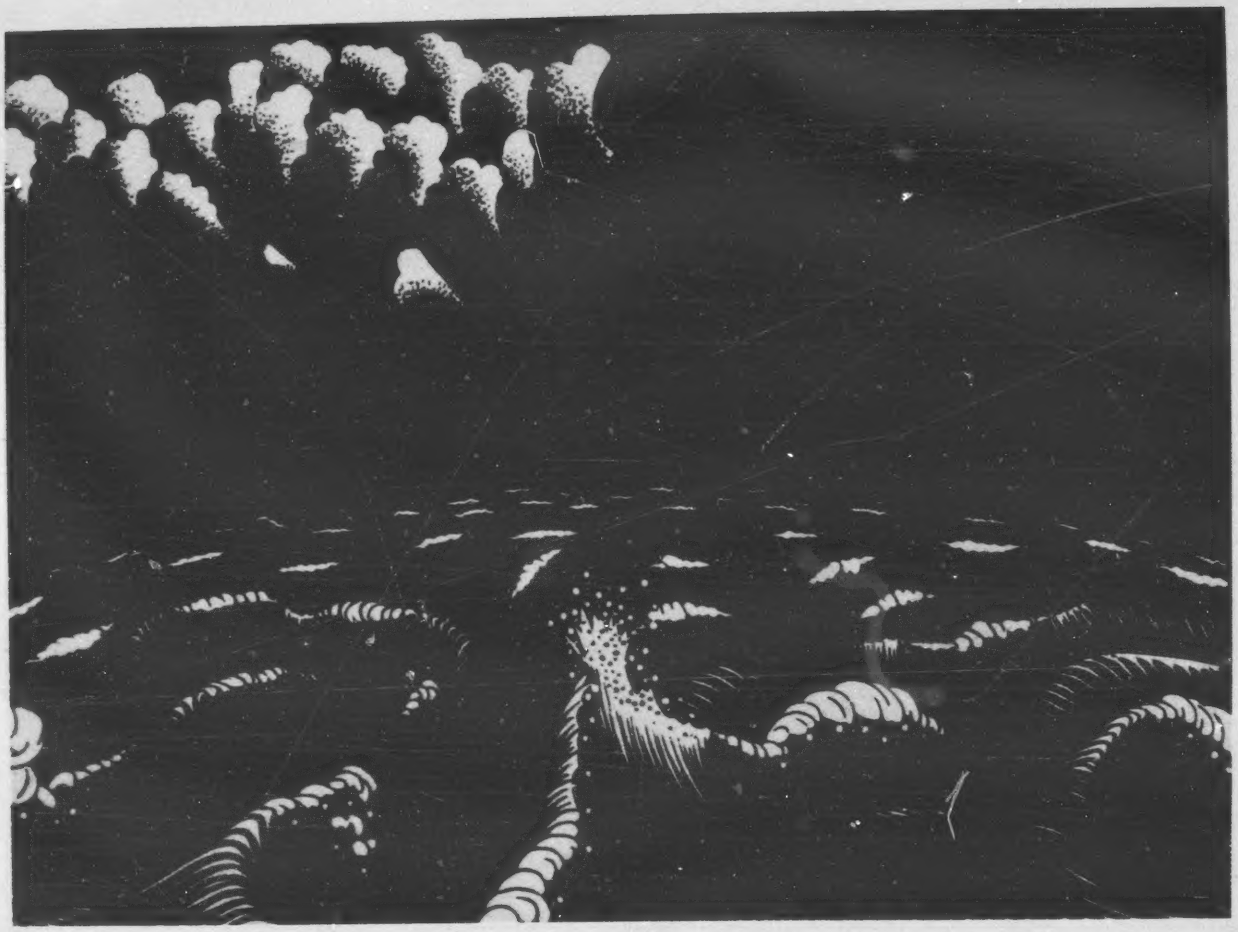

Plate 4

CURRENT ISSUES IN THE EPIDEMIOLOGY OF DRUG ABUSE AS RELATED TO PSYCHOSOCIAL STUDIES OF ADOLESCENT DRUG USE

Robert H. Eichberg, C. Phil., and Peter M. Bentler, Ph.D

University of California, Los Angeles

As the drug abuse research field develops, it seems that there is a clear movement to develop and implement various predictive indices of future drug abuse potential. More frequently, one hears of the prospect of prediction equations and collaborative studies to achieve such goals. Other papers included in this volume attest to this concern, particularly from a psychosocial and sociocontextual viewpoint. At least two contextual factors relating to the psychosocial dynamics of use (Becker, 1963) should be utilized to increase the power of such prediction equations: (a) information about the prevalence of drug use (how many people are using the given drug at the time the study is conducted) and (b) information of the incidence of use (how many new users there are within a given period of time). In short, one must develop a coherent conceptualization of how variables, measured by various types of items, relate to each other and to the drug-taking behavior of an individual or a group.

Because of its relevance to prediction studies, reference will be made throughout this paper to the proceedings of a workshop on "Current Issues in the Epidemiology of Drug Abuse, 1974." This paper focuses primarily on issues in epidemiology relevant to prediction. Predicting drug use is, in fact, very much a part of epidemiology, as noted by other researchers (e.g., Smart & Whitehead, 1974). Such efforts entail estimating the individual risks of becoming drug users; describing aspects of the clinical picture of users and the natural history of use; identifying syndromes by describing the distribution, association, and dissociation of clinical (intrapersonal and interpersonal) and demographic phenomena in the drug-using population; and searching for causes of drug use. Moreover, both the incidence and prevalence of drug use are essential factors in understanding the history of drug use in the population and changes in its character; diagnosing the "health" of a community and the conditions of use existing in it; and applying these findings to improvement of health and social services. We feel that it is important to do applied research and that the functional aspects of research must be viewed in terms of the complex nature of this field. The complexities of the drug problem have been pointed out by Fort (1969) and Nowlis (1967) as well as others. More recently, similar issues applied to research have been raised (Josephson, 1974a) in an attempt to make research more relevant. Much of the research we have reviewed focuses on narrow issues; it is often taken out of context, generalized, and used to imply the nature of the real world. It seems that researchers are several steps behind those working daily in drug prevention, education, treatment, training, and policy-making in terms of the issues with which they are struggling. Perhaps this is inherent in the nature of our science; but if so, why do we spend so much time and money in this area? If Nowlis (Proceedings, 1974) is correct in arguing that it is almost impossible to use epidemiological research for planning intervention and treatment programs, that results are often out of date before they are reported, and that local studies which focus on in-depth questions are likely to be more useful, then where have we gone astray? Such questions, of course, are negative and unproductive at this stage; rather the positive question must be asked: How can we shape research so that it is useful to people working in the field and not just to other researchers?

The widely attended "North American Congress on Alcohol and Drug Problems" (December, 1974) can provide an indication of the nature of the applicability problem. Drug abuse became "big business" when middle class whites started using illicit drugs, particularly marihuana, and this use was called to the public's attention as the "drug epidemic" (McGlothlin, 1975). The media may have helped create the problem; it certainly contributed to its spread, and the political response played a significant role as well. Money became available for programs and research, causing an "epidemic" of drug abuse experts (and we believe there is a causal relationship, not just an associational one). Not to be overly critical of researchers, instant experts appeared at the "street level," as well as in the "ivory towers." Now, several years later, there are many experts (some would argue that there are no experts), 4,000 of whom attended the North American Congress for an entire week of meetings. The program structure gave recognition that the interests are vast: politics, criminal justice, education, health, treatment, training, awarding of credentials, religion, research. What was less clear was how, if at all, these areas interrelated. Understandably, most people seemed to attend a limited range of programs, so there appeared to be little cross fertilization of ideas and only sparse communication.

The communication gap which existed was further enhanced by the different personal backgrounds of those at the Congress. There was a fair representation of minority group members; but as the Black caucus pointed out, they were underrepresented in planning sessions and on panels. The research sections were almost completely white, even those addressed to issues which were directly relevant to minority communities. We raise this point not to be negative but to call attention to an important problem. Many of the prevention and treatment programs are located in minority communities and are run by Black and Spanish-speaking individuals. It seems as if we are not sufficiently cognizant of the role that research plays in effecting public policy and understanding. Drug abuse is not solely a white middle class phenomenon, and we must incorporate this awareness into the decisions we make regarding the prediction of drug use.

Several other issues involved in drug research and their applicability are explored by Josephson (1974b) and we do not want to belabor them here. Considering the complexity of the drug abuse research area and the continuing relevance of minority involvement, we contend that planning sessions for prediction studies should have a two-pronged approach. One emphasis should be on evaluating the current state of drug research, viz., what we know about predicting drug use, what variables are likely to have predictive validity, what items best assess these variables. The other emphasis should be on evaluating various predictive items in terms of their usefulness within a given population. We should not uncritically accept items on the basis of their performance in the high school and college populations typically studied. This means that while a given item may not be useful for the secondary school population, it may be useful for a clinic population, drop-out population, Spanish-speaking population, or others. Attempting to evaluate predictive items in this way is likely to increase the ultimate utility of research.

CHOISIR C'EST RENONCER

To choose is to renounce, and when we select variables for a study we undoubtedly leave out others which may be equally important for a full understanding of the research question. Drug use and drug abuse are complex phenomena. Understanding them requires knowledge of drugs, people, and social systems since the effects of a particular drug are the result of an interaction among the pharmacological properties of the drug (e.g., dose, route of administration, and quality), the personal characteristics of the user (e.g., set and values), and the context in which the drug is taken (e.g., physical environment, people present, and cultural attitudes) (Becker, 1963; Fort, 1969; Kaplan, 1970; Nowlis, 1967; Unwin, 1969).

Rarely do we take all of these factors, or even most of them, into account when collecting data. We make choices about those variables we can realistically measure given the limitations of our questionnaires, interview schedules, ethical and time constraints, and current knowledge. Furthermore, many drug studies ignore the pharmacological properties of the drugs and rarely collect data on the quantity or quality of the drugs used. The importance of collecting more data on the amount of use rather than just the frequency of use has been stressed by McGlothlin (Proceedings, 1974). In his own literature reviews McGlothlin has taken quantitative as well as qualitative differences in marihuana use into account while comparing use across different countries (McGlothlin, 1971, 1975). Josephson (1974b) also has discussed thoroughly this issue in reviewing the several dimensions of marihuana use.

Fitzpatrick (Proceedings, 1974) has emphasized the importance of understanding the particular community in which a study is conducted. Again, knowing the context is critical to any in-depth study that is likely to lead to policy implications and recommendations. Cisin (Proceedings, 1974) has argued that drug use is not a homogeneous concept, but a phenomenon which requires that a long list of items be asked regarding drug use. Consequently it may be extremely difficult, if not impossible, to design a single nationwide study that could focus on all of the critical issues in depth.

In view of these problems, we urge researchers to realize that as item choices are being made, other possibilities are being renounced. When certain items are eliminated, it is imperative that commentary clarify why variables or approaches are rejected or are given low priority. Presumably exclusions will be made for reasons other than simple failure to find any predictive relationships with a given set of items. Furthermore, it should be clear that items not recommended highly for one purpose might be quite appropriate for another. Appropriateness is multidimensional. Researchers should be encouraged to acknowledge the limitations of their data as thoroughly as they report their results. This may encourage a more thoughtful approach to research and hopefully will discourage overgeneralized and/or inappropriate conclusions.

DEFINITION OF TERMS

The importance of reaching agreement on the definitions of terms in drug research has been raised many times (Elinson, Haberman, Hervey, & Allyn, 1974; Josephson & Carroll, 1974). It is well known that efforts to measure the extent and nature of nonmedical drug use have taken the form of nationwide surveys, surveys of high school populations, surveys of college and university populations, and surveys of other special populations (for a review see Glenn & Richards, 1974). Trying to integrate the findings of these surveys presents a rather difficult problem since there appears to be very little agreement on precisely what the different surveys are measuring. The same terms are operationalized in a variety of ways, even to the extent that different criteria exist for "drug use."

In an attempt to encourage comparability and replicability of research in drug use, the Special Action Office for Drug Abuse Prevention (SAODAP) is sponsoring an ad hoc committee to review the terms used and the way they are operationalized. The committee is charged with making recommendations to other researchers about the most productive way to conceptualize various terms. Although this is a difficult task, the concept papers which will emerge from the committee's efforts will be a major step forward for the field. The committee is focusing on concepts such as : use "ever"; frequency/quantity "ever"; onset of use; recent or current use; reasons for use (including nonuse and interest in trying, maintaining or changing use): typology of drug use; history of use; polydrug use; methods of use and dosage; conditions of use; effects of use; pathology of use; and availability.

THE PROCESS OF PREDICTION

We have discussed several general principles of predictions and how to increase predictive validity elsewhere (Bentler & Eichberg, 1975). One form of prediction, generally derived from cross-sectional correlational studies, is to predict the behavior of drug use from knowledge about the individual of other factors taken at the same point in time. There has been considerable work already undertaken with this approach, primarily focusing on student populations. Another form of prediction, more often associated with longitudinal studies, is predicting drug-using behavior at a given point in time from data about the individual gathered at a previous point in time. Few studies of this type have been conducted in relation to drug use (Haagen, 1970; Jessor, Jessor,

& Finney, 1973; Smith, 1973), yet such studies are likely to produce the most valuable data for identifying predisposition to use.

McGlothlin (Proceedings, 1974) has strongly recommended the need for longitudinal studies, stressing the high payoffs in terms of understanding the dynamics of drug use. We concur with this view, and in our own work at UCLA we are currently launching several small longitudinal studies. Some of the practical difficulties with longitudinal studies, enumerated by Johnston (Proceedings, 1974), involve 1) assessment of maturational changes, 2) tracking subjects over time, and 3) keeping respondents interested and involved in the study. It is often difficult to gain access to populations for longitudinal studies since this requires careful identification of subjects and thus increases the problems of guaranteeing confidentiality. Moreover, the more transient subjects and consequently the most difficult to track are also likely to be those at highest risk for drug involvement; this is a potential bias in research results. The consequences of attrition in longitudinal samples must also be carefully considered. There are numerous other problems. For example, when an interviewer is used, the interviewer effect should also be accounted for. Some other technical and ethical considerations in data collection for a longitudinal study are discussed by Manheimer, Mellinger, Somers, and Kleman (1972).

Regardless of the numerous special problems specific to longitudinal research, we are in favor of utilizing this method. It is recommended that future prediction studies relate specifically to this difficult problem of predicting whether an individual will use drugs in the future based on data acquired prior to the onset of drug-taking behavior. From a clinical viewpoint, we feel that early identification of problematic behavior is critical in the fields of health, mental health, and education. It would be disappointing if new research were to simply focus on variables concurrently associated with drug use, research which we feel has little, if any, potential application to early identification.

It is also necessary to consider whether differentiating drug use (meaning "ever" use of marihuana) from nonuse is really an appropriate criterion. The point has been made that even those who use marihuana only once are different both behaviorally and attitudinally from those who have never used it (Josephson, 1974b). However, researchers investigating the relationship between personality factors and the extent of marihuana use also have reported that "occasional" or "casual" marihuana users appear to be more similar to nonusers than they are to frequent users (Brill, Crumpton, & Grayson, 1971; Lewis, 1972). At the very least, psychopathology should be an appropriate additional criterion. For example, the results of a study comparing MMPI profiles of hospitalized drug users, nonhospitalized drug users, and nontreated drug users suggested that a broad continuum of pathology is associated with drug use, ranging from severe psychopathology through relative normality (Burke & Eichberg, 1972). This is not meant to suggest that psychological problems should be the only yardstick for assessing problematic drug use, but it certainly should be considered one important component of the equation. Other components might include physical problems, legal problems, social (interpersonal) problems, family problems, and school-related problems.

Another way of considering the criterion problem rests with the notions of quantitative vs. qualitative differences. Even if we distinguish between nonuse, ever-use, and continued use, we are only considering a quantitatively different aspect of usage. We must also consider variables such as detrimental effects of drug-taking behavior, which are qualitatively different from the rest. Ideally, one would like to be able to make fine predictions regarding the relative risk of someone being in the range of detrimental drug use. This is difficult since any degree of drug use, even nonuse, has the potential of having detrimental, drug-related consequences (e.g., a nonuser being arrested for being in the presence of a user). At the present time we are far from this type of qualitative prediction, although it may be worth some consideration.

In concluding this section, a word on the issue of applied utility is appropriate. If one predicts that a person will "ever use" drugs, what utility does such a prediction have? Will the individual be labeled "marihuana prone?" If so, what type of intervention, if any, should be made? Does the labeling have any ethical implications in view of our limited ability to help individuals? Perhaps the real utility lies in predicting to what degree an individual or group of individuals will be at risk in terms of a specific type of drug abuse. To do this, one would need to know the type of people most likely to use drugs, those most likely to have problems with drugs, the types of environments most conducive to drug use, and the types of environments most likely to precipitate problematic drug use. Such specific knowledge would be least objectionable ethically and legally, but we are not convinced our research is anywhere near being able to make such specific statements.

There would also be utility in predicting early onset of drug use since this is reportedly associated with continued drug use as well as problematic drug use (Shearn & Fitzgibbons, 1972). If, for example, one finds that those who drop out of high school are at high risk in terms of being "early" users and possibly also problematic users, then specific intervention procedures can be developed to reach this identifiable group. If such a goal were sought, it becomes obvious that the selection of an appropriate age range for initial testing must be kept in mind; clearly questionnaires aimed at one age group may have no relevance to another. One must be aware of more than mere vocabulary level, since the subcultures at different ages can be quite varied. These issues lead to considerations involved in selecting the "target population."

DEFINING THE TARGET POPULATION

The problem of defining a target population is a critical one; items must be selected because they have potentially heuristic value for predicting drug use within a given population. The nature of the variables, as well as the structure of the items, may vary depending on the population in which the study is being conducted. In view of the relatively narrow age range of risk for drug-taking behavior, major efforts must be directed at persons under 30 (Robins, Proceedings, 1974). However, the specific ages to be selected are somewhat problematic.

Research reports attest to the difficulty of obtaining adequate response rates from most target populations. The general population has become saturated with questionnaires of all types, and this has probably affected the response rates on drug questionnaires. In drug studies the "floating population" is the most difficult to reach, yet its members are at high risk for the behavior under study. Consequently, rather than focusing on populations of greatest relevance, most large surveys have simply been targeted at students. It is easier to conduct college and university studies since researchers generally have ready access to these populations. The response rate is likely to be better as the result of a number of convergent factors: acceptance by this population for filling out test forms and questionnaires, intellectual interest in the study (particularly as related to drug use), willingness to follow the request of instructors, and others. However, the question must be raised as to whether this is, in fact, the most relevant population for study.

The college population is restricted in range on many variables, although it represents a wide variety of background variables and interpersonal styles. Everyone shares the common trait of being currently involved in higher education, which in itself implies a high degree of self-selection coupled with varying types and degrees of social and academic selection. It is a very different choice to spend the years between ages eighteen to twenty-two as a student than to spend those years working, stealing, traveling, or "doing dope." While the college group may indeed be at "high risk" for certain types of drug taking, the type of drugs taken and the manner in which they are taken is also very limited. In order to function within the college setting, it is likely that the individual 1) cannot be a "chronic" drug user, 2) does not reject "conventional values" in practice as much as he does intellectually, 3) probably uses drugs primarily during leisure activities (or at least after essential work is completed), and 4) is likely to be in a transient (as opposed to committed) situation with regard to drug use.

High school and junior high school populations include a broader range of respondents (assuming a high response rate), and it is more likely that at the lower end there has not yet been an onset of drug use; but in the past decade the age of risk has gone down. Consequently, the age of our target populations must go down if we are to assess the onset of drug-taking. This is particularly important if we are to focus our attention on detrimental drug use, since it is likely that the "early users" may also be the most troubled users.

Thus, it may even be necessary to include elementary school youngsters in our studies. This age group is least restricted in range on many variables and least likely to have begun using drugs prior to being identified for study. It can yield much information of value; however, focusing on early school populations can cause special problems for researchers. First of all, it is more difficult to gain access to schools and particularly the younger students. Second, there are various difficulties involved in securing "informed consent" from parents, and this problem is intensified in the younger age groups. Furthermore, self-administered questionnaires are almost impossible to utilize, since reading and attention levels vary greatly and may be particularly low among those children most at risk for future drug use. If the target population is elementary school or below, the necessity for using data sources other than the child himself is critical (see Bentler & Eichberg, 1975, for a discussion of alternative data sources).

An additional consideration in choosing target populations is whether variables predictive of marihuana use and predictive studies focusing on the life-styles of drug users should focus primarily on white middle class populations, a point mentioned previously. The literature on drug use can be cited to show that the white middle class is the most appropriate target group, as the chances of being a user are particularly great for white males from families with relatively higher incomes (Anker, Milman, Kahan, & Valenti, 1971; Johnson, 1973; Josephson, 1974b; Steffenhagen, McAree, & Zheutlin, 1969a). However, the validity of such a conclusion is questionable, as these studies have drawn on university samples having all of the limitations already discussed as well as additional ones, i.e., ethnic and economic ones. One could argue that the experience of being Black and in college is quite different from the experience of being white and in college. A middle class adolescent may grow up with little doubt that he will go to college and achieve middle class adulthood. He is often cynical about education and about the virtues of making money and establishing a career. An adolescent from a minority community can rarely afford to be as cynical and is likely to be more serious about his education and its ultimate goals. Thus, drawing conclusions about race effects from surveys in college populations is a very questionable procedure, and selecting questionnaire items from such surveys may have built-in problems. These difficulties may already exist at elementary through high school grade levels, where there exists a high drop-out rate coupled with various other educational differences in schools located in minority communities. We must acknowledge these problems and stop focusing research only on those areas where we are most comfortable. As long as we continue to focus on univeristy samples, the data we collect is of extremely limited utility.

On the other hand, if we choose to work in minority communities, additional complications are added to the ones already mentioned. Language differences intensify the need for various data sources to be used, questionnaires may have to be translated into Spanish, the argot for drug abuse may not be the same in different cultural groups, and access problems will undoubtedly be greater. Furthermore, the selection of variables will perhaps be even more difficult since many of the variables currently associated with drug use have been derived from studies of university populations.

Robins (Proceedings, 1974) has recommended several steps which might be taken to maximize the opportunities for getting maximal payoff from our efforts: (1) study homogeneous populations in terms of changes in trends and age of risk, (2) study high-risk populations, (3) develop a complete roster of all of the people in a carefully defined population prior to the onset of the behavior in question, (4) over-sample within the given population, and (5) set no limits on the number of callbacks. Some of these recommendations should be applied to efforts at predicting drug use.

In summary, it is recommended that the target population for a prediction study include the very young, elementary school and perhaps even pre-school children; that Black and Spanish-speaking youngsters be included in the study; and that research tecnhiques be adapted to the specific populations being studied.

COLLABORATIVE EFFORTS

Several possibilities for collaborative efforts exist, but two strategies seem most appropriate. One is to conduct a large national survey with several investigators, each responsible for data collection in a given region. The other is to develop several smaller studies, each of which could focus on questions particularly relevant to specific groups, and each of which would include appropriate selections from a master set of questionnaire items. We favor the latter approach. It would allow a broader range of items to be studied since one national study of necessity would be limiting the items to a manageable number, therefore losing some of the items which should be tested in a predictive model. This approach would also increase the likelihood of success in difficult populations because the specific needs of the target group could be considered and their investment in the study thereby increased. It would also increase the probability that some payoff would result from such efforts, at a local level if not a national one. This multiple study approach is also most likely to stimulate a broad range of creative studies and to maximize the talents gathered. It would allow us to cast our findings in the context of local trends in incidence, prevalence, values, and other factors which are likely to be necessary variables in the prediction equation. Finally, if the items used in each study are drawn from a single master list and the concepts used are operationalized according to the recommendations of the SAODAP ad hoc committee, this process would enhance the comparability and replicability of results across studies.

KEEPING UP ON FADS

McGlothlin (1975) refers to several factors which indicate that the "middle class drug epidemic" may be appropriately considered as a fad: 1) usage is mostly among the young; 2) it has shifted from lower class minority groups to middle class whites; 3) normal curiosity and rebelliousness more often are factors in initiation than in personality defects or poor family background; 4) the predominant use pattern is one of infrequent usage of small quantities; and 5) the spread to other countries suggests that the "style" is being copied. Thus, there are indicators that the style may be more important than the pharmacologic properties of the drug.

If there is a heavy concentration of adolescents in the target population, as undoubtedly there will be, special problems relating to fads must be considered. It is necessary to be aware not only of national but also of local trends in order to recognize fads when they occur. We believe this issue is important because, as researchers, we not only collect data about people's drug use, we may also affect their drug usage.

For example, in our efforts in preparing to pretest a questionnare in an East Los Angeles school district, there was a fad of taking "flying saucers" at one of the high schools. As "flying saucers" did not appear on our survey (and often "street" names do not), we faced several problems. If a student wanted to acknowledge that he took "flying saucers" but did not know where they belonged in the questionnaire's drug typology, he might leave it out all together or he might show it as a positive response to use of hallucinogens, barbiturates, or amphetamines. Such frequently occurring situations can seriously bias the results of a study. To obviate this problem, therefore, we had the drug analyzed and found that it would be appropriately categorized as a barbiturate. Now what? If we put it into the barbiturate category, we might be encouraging experimentation with other drugs in this same category. Additionally, if a student responds to using barbiturates because of the inclusion of "flying saucers" in that category, have we really tapped his commitment to barbiturate use or his involvement in a local and perhaps shortlived fad? A further problem was whether or not to include this drug in questionnaires being administered at other schools. A "flying saucer" may be pharmacologically different at another school, assuming that it is there at all. If it is not available at another school, what is our ethical responsibility in terms of introducing it? As Chambers (Proceedings, 1974) has pointed out, placing an infrequently used drug on the questionnaire may encourage its use in a population where the drug had previously not been widely used.

In terms of predictions of marihuana use, a question such as this is not likely to arise, since there is probably sufficient data to indicate that if someone reports use of a less prevalent drug, he is also most likely to be using marihuana (Barter, Mizner, & Werme, 1971; Cisin & Manheimer, 1971; Josephson, 1974b; Robbins, Robbins, Pearlman, & Philip, 1970). However, it does underscore the necessity of knowing local fads in order to understand the contextual meaning of use. For example, it is possible that at some schools "flying saucers" are more prevalent than marihuana.

UTILIZING OTHER DATA SOURCES

Particularly relevant to estimating the prevalence of opiate addiction in a community are indicators such as death rates, hepatitis, buys, DAWN (Drug Abuse Warning Network), and urinalysis. There are problems related to applying and extrapolating data from these sources as well as from various registers and computerized systems, but these indicators of the drug abuse problem in given communities might be useful in clarifying the context within which marihuana is used.

There is a wide variety of other sources which can be used to understand local trends in drug use. We strongly recommend their use, wherever possible, and discuss them more thoroughly elsewhere (Bentler & Eichberg, 1975).

DEMOGRAPHIC VARIABLES

This final section of the paper examines some of the demographic or background variables which might be included in future predictive studies. The following review, by no means meant to be exhaustive, will focus on six variables and briefly cite several additional ones.

AGE. Age has been reported to be related to drug use by several investigators (Block, Goodman, Ambellan, & Revenson, 1974; Hochman & Brill, 1971; Josephson, 1974b) and age at first use was found to be a factor in whether someone becomes a "chronic user" (Hochman & Brill, 1971). Furthermore, among medical students, Lipp, Benson and Taintor (1971) found that those who used before 1965 were more likely to be "current users" and that current use decreased with each later year of initial use. Shearn and Fitzgibbons (1972) compared drug use of 167 psychiatric patients with a survey of 26,000 college and university students. The patient population used more drugs than the general college populations, and the authors reported a relationship between age of first use of any drug (generally marihuana) and the extent of later involvement. They concluded that "at least among those who are psychologically vulnerable, the using of any drug before the age of 15 predicts with great accuracy future drug involvement, i.e., the eventual use of barbiturates and narcotics (p. 71)."

Taken as a whole, then, it would appear that it is important to know the respondent's age in order to determine when he will enter a high-risk period. As noted previously, the high-risk period, while generally spoken of in terms of national trends, is much more relevant if viewed on a regional or local basis; and it therefore becomes necessary to have some indices of the age of use in the respondent's community (e.g., age range of use, mean age of use, modal age of use, and age curve of incidence). Thus the above reference to age 15 constituting "early" use and therefore being prognostic of problem use should possibly be determined in relation to the local trends as well. Since trends change quickly, each change should be fed into the prediction equation as it occurs. We are assuming, of course, that situational effects and availability of drugs are related to an individual's choice and use of drugs, that use is not based solely on interpersonal and intrapersonal variables.

SEX. A fairly consistent relationship between sex and drug use, males being more likely to use drugs than females, has been reported (Hochman & Brill, 1973; Johnson, 1973). However, Block, et al. (1974) reported that in half of the cities included in their feasibility study sex did not reliably relate to drug use. The cities in which sex did not relate were those which were not "landlocked;" a possible explanation is offered that drug use in these cities has been effected by "women's liberation." We have heard similar reports from treatment programs. If women's lib is indeed the explanation, it stands to reason that sex would relate differentially to drug use depending on the population being studied. The predictive values of one's gender might vary depending on the community, ethnic group, age group, school, region of the country, or the variable with which the individual identifies. Therefore, it would again seem appropriate to follow trends, this time in terms of the distribution of drug use by sex within a given population, in order to strengthen the quality of this predictor.

ETHNICITY. College studies have often reported that whites are more frequently involved in drug use than Blacks (Hochman & Brill, 1973; Josephson, 1974b). Johnson (1973), however, reported no differences; and Block, et al. (1974) reported that the relationship between race and drug use varied city by city. We must again look at the local dynamics to understand the role ethnicity plays in one's choice to use drugs.

SOCIOECONOMIC STATUS. Several studies indicate more likelihood of drug use among students from upper-middle and upper income families (Anker, Milman, Kahan, & Valenti, 1971; Goldstein, 1971; Goldstein, Korn, Abel, & Morgan, 1970; Steffenhagen, et al., 1969a) and among students whose fathers have a higher occupational level in managerial or professional jobs (Anker, et al., 1971; Harris, 1971). In relation to parent's education, Goldstein, et al., (1970) report no significant difference between users and nonusers but note a trend toward less parental education for nonusers. Two other studies report higher educational achievement for parents of users than for parents of nonusers (Harris, 1971; Goldstein, 1971). Block, et al., (1974) report results which are consistent with the latter findings.

Again the question must be asked in terms of prediction: If we want to predict who will or will not use drugs in Watts or Harlem, will this same variable be applicable? Based on the available data, we cannot yet answer that question.

RELIGIOSITY. Drug users tend to have less affiliations with traditional religions, indicated by both their convictions and their attendance at services, and Jewish students are over-represented among the drug-using group (Anker, et al., 1971; Cowan & Roth, 1972; Goldstein, et al., 1970; Goldstein, 1971; Goode, 1970; Hochman, et al., 1971; Steffenhagen, et al., 1969b). Block, et al. (1974) report findings consistent with this. This should prove to be an important predictor since the degree of religious affiliation provides some insight into an individual's current life-style.

SCHOOL-RELATED VARIABLES. Varied findings have been reported regarding the relationship of scholastic grades and drug use. Pearlman, et al., (1971) reported no significant relationship between grades and drug use. Anker, et al., (1971) confirmed this finding for current grades but found an inverse relationship between past grades and marihuana use for undergraduates. Two other studies found that occasional users tended to get better grades than either heavy users or nonusers (Goode, 1971, 1972; Hogan, Mankin, Conway, & Fox, 1970). Another study reported consistently higher grades for drug nonusers than for users (Block, et al., 1974). An interesting prospective study by Haagen (1970) reported that users performed as well as or exceeded the performance of nonusers on a variety of scholastic aptitude tests but that they were less invested in their academic work and received generally poorer grades than did the nonusers.

Again, the difference in findings may represent a difference in terms of both the type of use and the dynamics of use on the different campuses being studied. In an attempt to systematically study the life-styles of students, Groves (1974) developed a series of characteristic student life-styles and related these to drug use. He also studied the extent of drug use in 48 schools, stratified by 1) high and low selectivity (a factor assumed to be related to marihuana and psychedelic use) and 2) type of control (public, private nonsectarian, and private religious affiliated). He concluded that the extent of drug use on a given campus can be predicted with a high degree of accuracy of stratifying schools on these two dimensions.

These findings suggest that the school attended, rather than just the grades achieved should be part of the prediction equation. Certainly the nature of the school tells us something about the context within which one uses drugs and about the availability of drugs to the student. Of course, in terms of school-related variables we should also consider factors such as attendance, number of school transfers, and disciplinary problems (Halikas & Rimmer, 1974).

OTHER VARIABLES. Additional background variables that might be included are: number of arrests, nature of arrests, family structure (e.g., with whom does the respondent live, birth order, number of siblings), number and types of childhood illnesses, and previous psychotherapy. Clearly there are many other possibilities.

We reiterate our belief that demographic variables associated with drug use at the high school and college level are likely to provide poor clues to drug use predisposition; consequently, their relevance to prediction may be questionable. While the variables reviewed may indeed have the potential of predicting drug use, their real predictive validity must be tested in carefully defined, relevant target populations.

SUMMARY

Developing a set of potentially heuristic items to predict drug use is discussed in terms of current issues in the epidemiology of drug abuse. The utility of predictive research is explored in view of the multidimensional complexities in the drug field. The problem areas of defining terms, deciding the type of predictions desired, selecting relevant target populations, being cognizant of fads, and keeping in mind a variety of data sources which might be necessary to complete a prediction equation are discussed. Demographic variables which are relevant to predicting drug use are briefly reviewed. Additionally, the feasibility and nature of future collaborative research efforts are discussed in relation to the importance of interpreting data regarding social trends and dynamics of the populations being studied.

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THE QUEST FOR PREDICTORS OF MARIHUANA ABUSE IN ADOLESCENTS

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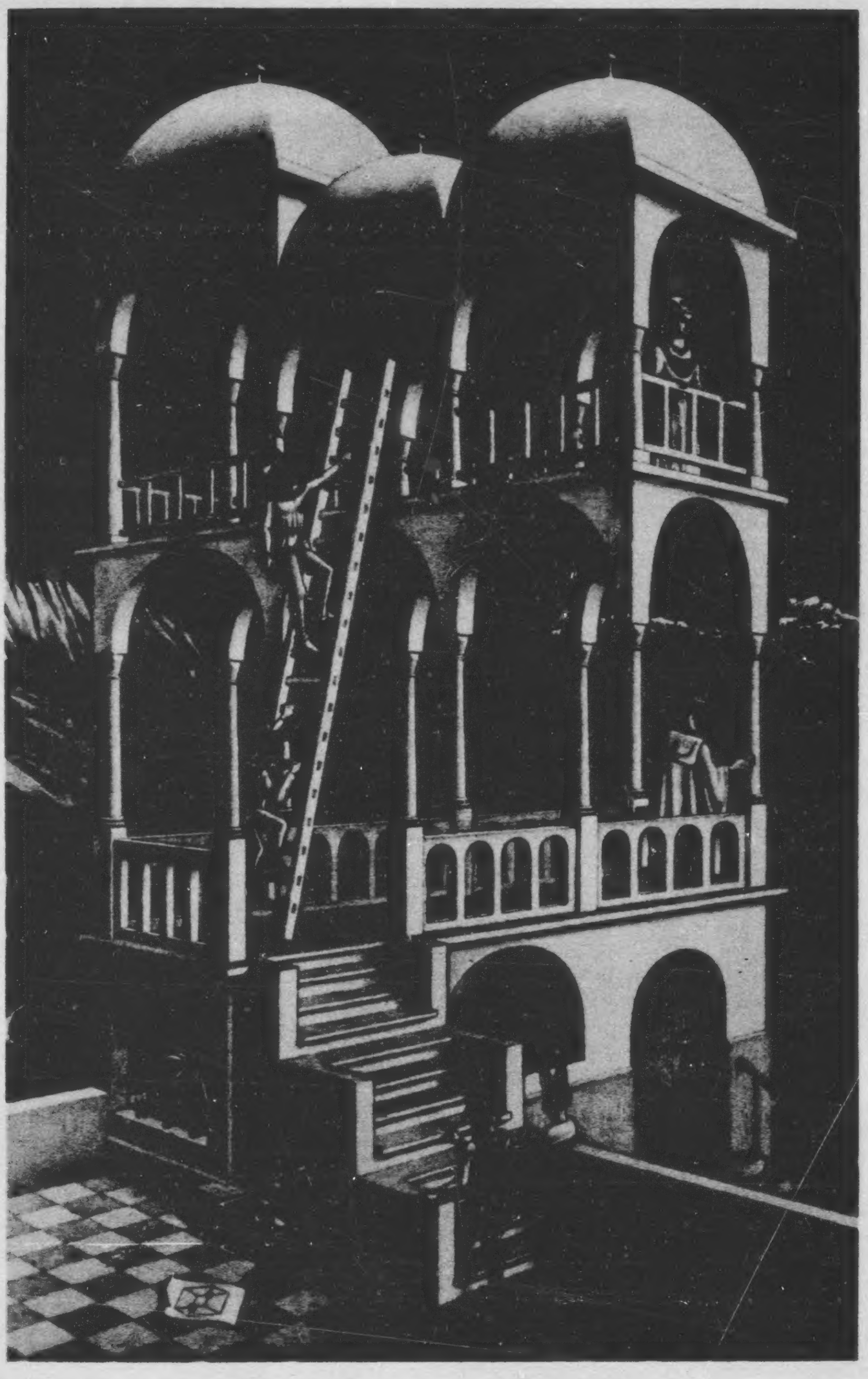

Plate 5

THE QUEST FOR PREDICTORS OF MARIHUANA ABUSE IN ADOLESCENTS

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This paper is prepared as though a large-scale collaborative effort for the Public Health Service in which the charge is to attempt to find reliable predictors of "continued and future drug abuse in adolescent populations" were about to be organized. It assumes that the major interest lies in marihuana abuse. The problem of "future" rather than "continued" abuse will be emphasized since it is suspected that two very different approaches would be needed to investigate these two questions in an adolescent population.

ANALYSIS OF PROBLEM

Criterion Variables

First thoughts of criterion variables center around the question of what meaning should be given to the term "abuse." So many previous attempts to study this question appear to have settled for "heavy use" as being synonymous with "abuse." Does "heavy use" imply "excessive" use and therefore "abuse"? If the assumption that true abusers must be a subset of heavy users is accepted, then a study which limits itself to a comparison of "heavy users," marihuana "virgins," and discontinuers cannot yield very accurate predictors of abuse per se. Yet if it is only future marihuana *usage* in which there is interest, then the researcher can relax and look forward to few problems in defining and measuring major dependent variable(s).

On the other hand, there is an uneasy feeling that, from the public health point of view, marihuana usage is a necessary but grossly insufficient criterion measure, quite heterogeneous in its meaning, and probably not worth the time and money required to find its antecedent determinants. For example, if five years from today all that were found were that high school students who have never smoked marihuana but who are high on predictors X_1, X_2, and X_3 will turn out to be heavy marihuana users three years later, the justification for the study would be seriously questioned.

A more convincing approach would involve tackling head-on the widely accepted view that *"excessive use"* and *"abuse" must be strictly defined in terms of some additional criteria reflecting specific adverse consequences either to self or society.* This complicates enormously the overall planning for a predictive study since it now becomes necessary to get data on a battery of measures in addition to marihuana usage which would allow the identification of a subset of users of special interest.[1] These measures would at the very least embrace such areas as (a) physical and psychological health and well-being, (b) social deviance, including opiate addiction and criminality, and (c) productive functioning in terms of home, school, and job performance. It will then remain to be seen whether, when, and how these measures can be obtained.

One special interpretive point is worth anticipating here. When "marihuana abuse" is considered in terms of the kinds of behaviors illustrated above, care must be exercised in relating predictors to these dependent variables to know when, indeed, behavior presumably caused by the use of marihuana and not just the behavior itself (caused by nondrug determinants) is being predicted. For example, if Predictor X is found to relate to some measure of psychopathology, how is it known that the effects of marihuana abuse are being viewed? Attempts to infer causal relationships from nonexperimental data are fraught with danger but can and must be undertaken for certain kinds of situations

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(Blalock, 1964). The task is considerably facilitated when the temporal relationships between the measurements are so clearly specified that antecedent and consequent events (*vide infra*) can be meaningfully discussed. This and other problems associated with allowable inferences to be drawn from the data must be given much thought in the initial stages of planning any large-scale study.

Predictor Variables

In a way, the selection of appropriate predictors for inclusion in the study poses the simplest problem of all. As common prerequisites, the choices should be limited to quantifiable, self-administered items, and clear items which are palatable to an adolescent population (caveat: in this "anti-test" era, the items must be similarly acceptable to school officials and to the parents of the population). It would be expected that most researchers have a few favorite predictors to recommend based upon their best evaluation of the literature and their own research, so there should not be too much difficulty coming up with a suitable list. It is doubted whether there is cause to worry about missing any potentially promising predictors, inasmuch as the investigators represented in this volume appear to cover the field so extensively. Rather, the guess is that the list may have to be pared in response to the reality constraints of available testing time for the subjects.

However, if certain scales or items advocated by various researchers have to be omitted from the final battery, it would be hoped that a true balance remains across the three behavior domains (interpersonal, intrapersonal, and demographic) covered in this volume. This is not because of an inherent egalitarianism in respect to the disciplines of psychology, sociology, and epidemiology; it is a belief that the history of behavioral prediction studies compels us to expect that if marihuana abuse is what we are trying to predict, no personality measures, singly or in linear or nonlinear combination with other personality measures, will yield very high prediction coefficients. That probably is true for demographic variables by themselves and for interpersonal sociological predictors as a class, too. Yet there is considerably more hope that by seeking interactions among these three classes of predictors, a better-than-average multiple prediction equation may be derived, even allowing for the high noise levels which will inevitably be carried in our predictor and criterion measures.

Just as it is reasonable to expect that marihuana abusers will be a subset of heavy users, it seems also plausible to expect that these abusers must be found in a subset of those heavy users with certain individual characteristics which make them especially vulnerable to key environmental (situational) pressures. The truism that most behavioral acts are determined by the interaction of individual characteristics with environmental forces seems especially apt in trying to predict marihuana abuse. Exposure to various peer contacts and pressures (generally unpredictable and uncontrollable from the investigator's point of view) appear to be strong determinants of marihuana usage (Kandel, 1973), and if these variables are omitted from final prediction equations, it must be realized that one will begin with an unnecessarily large component of error variance in addition to measurement error. However, if, the favorable assumption were made that sociologists and social psychologists would come up with some direct or indirect indices of these salient determinants,[2] then the next step must be to insure that methods of data analysis would take full advantage of the increased sophistication now available to seek multiple regressions with interactive as well as additive terms (Kerlinger & Pedhazur, 1973). Whether the various predictors combine disjunctively (additively) or conjunctively (interactively) in the final regression equation is ultimately an empirical question, but one must be prepared to search for the more complex possibilities.

Unless both individual and situational measurements can be successfully fed into the system, it would be difficult to be very sanguine about the outcome of this endeavor. If one allows for spurious inflation of correlation coefficients produced by a variety of factors associated with overly enthusiastic investigators who rarely replicate, reliable prediction r's of any importance exceeding .5 would be seldom found, and much more common would be r's in the .20's and .30's. This is especially true of sample multiple R's which by their nature must attenuate ("shrinkage") on cross validation. (Presumably the design of any prediction study which finally emerges would include split-sample, "jacknife," and other similar methods to permit cross-validation of initial findings.)

In psychopharmacology, wherein over the past two decades tremendous strides have been made in elucidating drug effects on behavior, it is noteworthy that reliable "main" drug effects (statistically speaking) are rather easy to come by, whereas psychological and pharmacological predictors of within-group variation are notoriously elusive. In some of our own work (Fisher, 1970), even when we have succeeded in finding a personality variable differentially predictive of response to a drug or placebo, the resulting correlations (from combining pharmacological variables interactively with psychological variables) are seldom above .4. These often involve predictor measurements taken very shortly before (sometimes the same day as) the response measurement.

These matters are emphasized because it is important that our expectations be realistic and that we have some idea in the planning of our study as to what kinds of interpretation will be made of some possible (probable) outcomes. Frequently this is an administrative problem with which the investigator-scientist does not want to be concerned. It is similar to the hoary issue of practical versus statistical significance. How satisfied will public health administrators be if the fruits of our best efforts yield a true R in the range of .4 to .5 when they were expecting an R of .8?

Temporal Conditions

For want of a better phrase, the term "temporal" is used to raise the question of what kind of "prediction" study should be planned. The problems change greatly depending upon the exact way "prediction" is to be defined. If the objective is to isolate intrapersonal, interpersonal, and demographic factors which will cross-sectionally differentiate and characterize marihuana abusers (when the predictors and criteria have been obtained concurrently), then the approach is straightforward and relatively simple, which is why it probably has been used so often. Needless to say, relationships (i.e., correlates) observed under these conditions are virtually useless for either increasing our understanding of causal systems or for giving some confidence that these very "predictors" would hold when they are used to predict future behavior. While this type of study definitely had its place in the past, what is clearly needed at the present stage of our knowledge is a prospective longitudinal study where the crucial aim is to seek a set of predictors which define a true *"at risk" cohort* -- i.e., *individuals who have an increased probability of becoming abusers at some future time, although they are presently not classified as such.* An appropriate study design, where an original sample can be followed at two or more intervals, will actually permit changes in marihuana use (and other behaviors) to serve as predictor variables as well as dependent variables, thereby improving our ability ultimately to draw causal inferences from the results.

To elaborate briefly, consider the following procedure: at t_1, select a group of adolescents who are marihuana "virgins" and obtain a complete battery of potential predictors. At t_2, perhaps a few years later, measure current marihuana usage (along with other drug usage), and also obtain "baseline" measures on behaviors which may be putative "abuse" indicators. At t_3, a few years later, remeasure all "abuse" behaviors.

While this is but a skeleton outline, incomplete in many critical details, it creates a structure in which one set of "predictors" truly precedes changes in marihuana usage (from t_1 to t_2) and in which the changes in marihuana usage are themselves antecedent to other behavioral changes (from t_2 to t_3). Then, as mentioned in the introductory portion of this paper, *adverse behavioral effects* which could be indicative of marihuana *abuse* can be taken into account in the data analyses in a number of different ways. As just one specific example, three requirements to guide our interpretations could be specified.

(a) Only those behavioral criteria changes which are significantly related to changes in marihuana usage should be considered as possible indices of marihuana abuse.

(b) Any predictors which significantly relate to a behavioral criterion satisfying condition (a) should also be significantly related to marihuana usage at t_2.

(c) In order to be sure that the predictors are related to that portion of the criterion variance presumably due to marihuana use, the most exacting requirement would be that the partial r between a predictor and the criterion when usage is held constant drops to zero (i.e., approximated by the finding that the partial r is no longer significantly different from zero).

This approach is strongly recommended, recognizing fully that not only is the the execution of such an investigation a terribly complex one, but also recognizing the possibility that 1976 predictors of 1980 marihuana abuse could lose all their validity in predicting marihuana abuse in 1984. Yet, this is precisely the kind of study where the special resources of a centralized federal agency are indispensable for success. The need for large N's dictates a collaborative effort (with superb precedents provided by the VA, NIMH's Psychopharmacology Research Branch, and NINDB's perinatal study). The ever-important problem of attrition in prediction studies, which can never be satisfactorily handled by any one investigator, can be dealt with neatly (as in Scandinavian countries concerned with health problems) by having a network of data bases across the country so that when a cohort member leaves one area, he can be picked up for continued data collection in another area. A NIDA-sponsored collaborative effort could provide solutions to the many methodological, logistical, and even substantive problems which tend to overwhelm the individual investigator.

RECOMMENDATIONS AND PREDICTOR (AND CRITERION) ITEMS

It was the original intent of this section to summarize some of the intrapersonal characteristics of adolescent and young adult subjects which have been put forth in the recent literature as being relevant to marihuana abuse. Instead, since the other contributors to this volume who are considerably more familiar with the literature will also be reviewing the literature in detail, the purpose of this section is to summarize a few patterns which appear to emerge from a general survey.

1) It is remarkable how many studies have begged the basic problem of drug *abuse* by taking drug usage as the principal measure to relate to such intrapersonal factors as personality, cognition, and attitudes.

2) Since most of these same studies obtained their usage data and other measures at the same point in time, it is almost always impossible to derive valid inferences (or even very educated guesses) as to which events, if any, might be causing which behavioral changes. It would not be at all surprising if some of these findings turn out to mean that drug usage can be a better predictor of cognitive and attitudinal change than the inverse. This point is stressed only because the understanding of the purpose of this volume is to consider the primary problem of predicting drug abuse and not the problem of the effects of drug abuse.

Nevertheless, by drawing upon past experiences under imperfect conditions to make decisions which have to be made, three kinds of measures are suggested which might be worth including in any proposed prospective study of marihuana abuse.

1) There are sufficient anecdotal and correlational reports in the literature linking heavy marihuana use and psychological "symptoms" (defined in the broadest sense) that it is inconceivable to imagine a study being planned which would not include a measure of psychiatric status as both a predictor and a criterion. Some may favor using "trait-oriented" scales like the MMPI, the Taylor Manifest Anxiety Scale, or similar instruments. While this kind of scale can serve as a useful predictor instrument, it would have to be coupled with a more sensitive indicator of change to be of maximal value. Attention is called to the Hopkins Symptom Check List (Derogatis, Lipman, Rickels, Uhlenhuth, &

Covi, 1974) which has been used extensively in psychopharmacological research with patients and with normals and has the special appeal that merely by altering the instructional set (time interval) to the subject it can be used as both a predictor and a criterion. It has been shown to be extremely sensitive to naturalistic and experimentally induced changes, the language is simple enough even for junior high students, and the fact that the items are tapping specific symptoms gives it face validity as a self-report instrument. Studies by Uhlenhuth (1974) using this instrument with normal subjects have shown clear-cut relationships between symptom levels and psychotropic drug use. (Dr. Mellinger's paper in this volume touches upon some of the implications of these findings for marihuana use and abuse.)

2) The second candidate for nomination as a measure stems from the recent work in our own laboratory in which a 40-item scale called the TYS ("Traditionalism/Yea-Saying") has been found to relate to a number of psychopharmacological experiences. Anxious patients with high scores (i.e., "acquiescers") rather consistently respond poorly to minor tranquilizers (McNair, Fisher, Sussman, Droppleman, & Kahn 1970; McNair, Fisher, Kahn, & Droppleman, 1970) yet appear to do quite well on placebo (Fisher, 1967). We have frequently found moderate negative relationships (-.25 to -.30) between acquiescence and marihuana usage, although in some samples the relationship cannot be found. More persuasive, however, is an acute marihuana experiment recently conducted by Dr. Douglas McNair and co-workers in which intoxicated subjects took part in an anxiety-inducing situation (simulated public speaking). When acquiescence was examined as a predictor of anxiety response, it was found that high acquiescers on marihuana showed an extremely marked increase in anxiety compared to nonintoxicated controls, whereas low acquiescers showed a relative marihuana antianxiety effect. This suggests the possibility that high acquiescers may be especially predisposed to dysphoric marihuana reactions in certain situations. It should also be noted that this is a splendid example of an intrapersonal predictor interacting with an environmental factor (drug) in a manner similar to that discussed earlier.

3) The final recommendation stems from data recently gathered in the course of a project dealing with hypnosis and marihuana. Using a variation of the Osgood Semantic-Differential, subjects were asked to describe their attitudes toward hypnosis on this scale. In three independent studies, we consistently found that marihuana virgins have unfavorable attitudes toward hypnosis. By a little indirect deduction, it is simple to fit this finding into the popular notion that the seeker of mind-expanding experiences has the proper stuff from which marihuana abusers are made. Whether or not this is the case, these findings are reported not for their substantive meaning but because it may well be that the Semantic-Differential offers a forthright means of tapping into an adolescent's attitudes about marihuana and these attitudes could well turn out to be excellent partial predictors of subsequent abuse.

SUMMARY

The Hopkins Symptom Check List, the TYS, and a Marihuana Attitude Scale based on the Osgood Semantic-Differential each would seem worthy of inclusion in any collaborative endeavor which attempts to find accurate predictors of subsequent marihuana abuse. Yet, there will undoubtedly be many other scales proposed by others covering similar behavioral areas, and some of these others might have more in their favor than the ones suggested.

What should be emphasized, however, is the deep conviction that the major problems facing the researcher who seeks predictors of marihuana abuse are not so much in the area of selecting appropriate predictors as in the selection of meaningful and feasible criteria of abuse. If a prediction may be made without abusing the reader's patience, it is expected that the eventual worth of any collaborative quest will hinge on how successfully the logical problems of interpreting obtained relationships between predictors and criteria can be solved.

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FOOTNOTES

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[1] While the term "abuse" does imply adverse consequences, it should be recognized that if evidence were available to suggest that heavy marihuana use could lead to a variety of facilitating or enhancing behavioral consequences, we might be seeking a very different set of criterion measures.

[2] These factors are hesitantly called "predictors" because it seems clear that these variables are operating either concurrently with or at best shortly prior to the onset of use or abuse. As discussed in the subsequent section, it is assumed that the vast majority of the "predictors" to be selected will refer to measurements taken one or more years prior to the criterion measurements.

APPENDIX

40 Item TYS

Below are some well-known quotations and sayings. Decide if you agree with, disagree with, or are uncertain about each statement. Fill in the blank below the answer that is closest to your opinion:

A = Agree
U = Uncertain
D = Disagree

Agree Uncertain Disagree

1. There is no reward like success.
2. Eat, drink and be merry for tommorrow you may die.
3. Faith is the root of all good works.
4. To be happy, always stay within the law.
5. He that is too cautious will accomplish very little.
6. In this life we get nothing except by effort.
7. He will be content and at peace, whose conscience is clear.
8. Every man should be a rebel until he dies.
9. If we desire respect for the law, we must make the law more respectable.
10. Better one safe way than a hundred of which you are uncertain.
11. The best way to get rid of temptation is to yield to it.
12. Being successful is merely a form of amusement.
13. Every hero becomes a bore at last.
14. The great pleasure in life is doing what you are forbidden to do.
15. One man's legal justice is another man's injustice.
16. A dollar saved is a dollar earned.
17. Good men must not obey the laws too well.
18. The only known cure for fear is faith.
19. A sense of duty is the basis of character.
20. My country may she always be in the right, but my country right or wrong.

Agree Uncertain Disagree

21. In matters of conscience, the law of the majority has no place.

22. They never fail who die in a great cause.

23. Wherever there is authority, man should be ready to rebel.

24. Live only for today, and you ruin tomorrow.

25. The policy of being over-cautious can be extremely risky.

26. Obedience is the mother of success.

27. It is better to be safe than sorry.

28. Democracy can become a government of bullies.

29. To know how to wait is the great secret of success.

30. The less government and the fewer laws we have the better.

31. The way to be nothing is to do nothing.

32. The highest duty is to respect authority.

33. There is fun in having lots to do and not doing it.

34. There are no substitutes for great achievement.

35. For a good cause, wrongdoing is virtuous.

36. Men who cannot do what they are told never amount to much.

37. The values of a good religion should change with the times.

38. Duty before pleasure.

39. To be a man, one must be a nonconformist.

40. You'll never have peace until you knock patriotism out of the human race.

15 ITEM MARIHUANA ATTITUDE SCALE

Please indicate the various meanings and associations that MARIHUANA has for you by placing one check on each line to describe your feelings toward the specified area.

For example, if you feel marihuana is extremely valuable, you would check the blank closest to the adjective "valuable":

	Extremely	Moderately	Somewhat	Neutral	Somewhat	Moderately	Extremely	
Worthless							✓	Valuable

If however, you feel marihuana is extremely worthless, you would check the blank at the other end of the line closest to the adjective "worthless":

	Extremely	Moderately	Somewhat	Neutral	Somewhat	Moderately	Extremely	
orthless	✓							Valuable

If you have no preferred feeling one way or the other, you would check the neutral osition in the middle of the line:

	Extremely	Moderately	Somewhat	Neutral	Somewhat	Moderately	Extremely	
Worthless				✓				Valuable

Use the blanks labeled "moderately" and "somewhat" to indicate intermediate feelings.

Please do not omit any items.

MARIHUANA

	Extremely	Moderately	Somewhat	Neutral	Somewhat	Moderately	Extremely	
WORTHLESS	______	______	______	______	______	______	______	VALUABLE
GOOD	______	______	______	______	______	______	______	BAD
CREATIVE	______	______	______	______	______	______	______	UNIMAGINATIVE
RELIABLE	______	______	______	______	______	______	______	UNRELIABLE
UNPLEASANT	______	______	______	______	______	______	______	PLEASANT
POSITIVE	______	______	______	______	______	______	______	NEGATIVE
UNFAVORABLE	______	______	______	______	______	______	______	FAVORABLE
BORING	______	______	______	______	______	______	______	INTERESTING
TRUE	______	______	______	______	______	______	______	FALSE
TENSE	______	______	______	______	______	______	______	RELAXING
BELIEVABLE	______	______	______	______	______	______	______	SKEPTICAL
NONSENSICAL	______	______	______	______	______	______	______	SENSIBLE
UNSATISFYING	______	______	______	______	______	______	______	SATISFYING
ACCEPTABLE	______	______	______	______	______	______	______	UNACCEPTABLE
UNINTELLIGENT	______	______	______	______	______	______	______	INTELLIGENT

ASSESSING THE INTERPERSONAL DETERMINANTS OF ADOLESCENT DRUG USE

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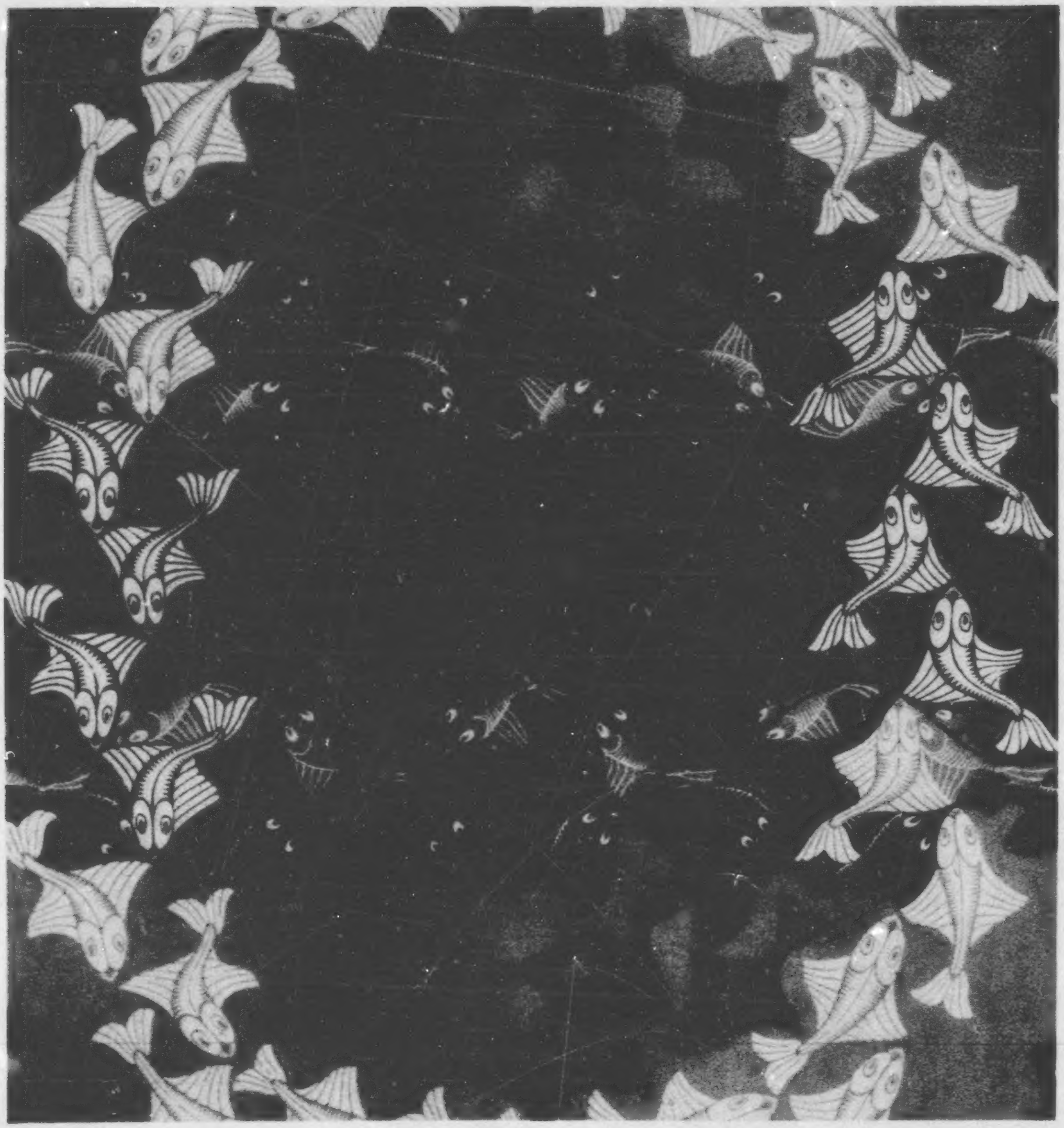

Plate 6

ASSESSING THE INTERPERSONAL DETERMINANTS OF ADOLESCENT DRUG USE

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One of the major concerns of this paper is to discuss the nature and form of optimal questions designed to "describe and predict" adolescent use of "soft" psychoactive drugs. The implicit rationale is to facilitate research which would allow us to discover before the fact which adolescents are likely to be harmed by the use of these substances. That is, ultimately we are concerned with the effects of certain drugs upon certain individuals. This concern immediately forces us, despite the pragmatic nature of the goal, to adopt a particular theoretical view of drug effects.

LOCI OF CAUSATION

Although the position is still the view held by most people, it is not necessary to argue before a professional audience the inadequacy of the "magic bullet" view of psychoactive drug effects. We do not regard a particular substance as creating a single, invariant effect upon each user in each instance of use. It is recognized that the subjective effects of psychoactive drugs (and of placebos as well) are created by an interaction of the characteristics of the substance taken, of the individual consuming it, and of the setting and circumstances in which it is taken (Schachter, 1964; Valins & Nisbett, 1971; Carlin, Bakker, Halpern, & Post, 1972). Each of these elements, the user, the drug, and the setting, of course, can vary on a large number of dimensions. The focus here is on interpersonal variables, but we shall of necessity consider selected aspects of all three of these loci of drug effect causation.

Subjective drug responses are readily conceptualized in terms of Lewin's field theoretical orientation (1951) wherein the determinants of behavior are represented and revealed as the result of person-environment interactions. This view, according to Sadava and Forsyth (1974), is supplanting both the personality trait or clinical view and the situational-structural view. These positions would place the primary source of variance within the person or in the setting of the behavior, respectively. The usefulness and advantage of the interactionist approach have been demonstrated by Jessor, Young, Young, and Tesi (1970) for alcohol use, and by Sadava (1973), and by Jessor, Jessor, and Finney (1973) for marihuana use.

A parsimonious theoretical explanation of students' drug experiences can be derived from the well-known experimental research of Schachter and Singer (1962) or from the social-historical observations of Becker (1963, 1967). Theirs are social learning views stressing the importance of the circumstances surrounding usage, especially the behavior of the others present. Initiation of usage is heavily influenced by peers. For example, we found that the probability of usage increases with the proportion of one's friends who use the given drug, and it decreases as the proportion of one's friends who disapprove of use increases. Furthermore, most students in our samples reported that they were introduced to usage by a close friend (Goldstein, Korn, Abel, & Morgan, 1970). Johnson (1973) also found strong relationships with friends' use, as did Kandel (1973). In all of these studies, associations of usage with peers' use were stronger than those with other background variables, even, as found by Kandel, stronger than with parental drug use.

Why should peer usage be so compelling in instigating use? Research in the social psychology of interpersonal attraction provides some suggestions which might profitably be tested in drug use research. It is recognized that other people can serve as a source of reassurance to a novice. In the case of drug usage, they may provide knowledge of usage techniques or reassurance that the particular supply of drugs on hand is safe to use. The mere familiarity of friends can be comforting because they are associated with previous pleasant experiences. Also, affiliation can reduce specific fears and provide help in reducing uncertainty about appropriate feelings. Other people provide the novice with models of appropriate behavior in the unfamiliar drug situation; this modeling can instruct and also help in overcoming internal restraints.

The effects of others can be assessed by inquiring into by whom and where the social influence occurs and then adding items designed to measure the expected forms of behavior in these situations, e.g., the norms of the respondent's reference groups. As obvious as this approach appears, it seldom has been employed in drug survey research. A possible means of assessing and comparing normative climates is provided by Jackson (1965).

The setting of usage is important in that it contains models of behavior and conveys expectations of appropriate behavior. The next logical step is to assess the degree to which the respondent inhabits settings likely to facilitate or to retard usage and the degree to which he feels he can and desires to control the amount of his participation in them.

Important settings are not only contemporary ones but also past settings in which significant drug usage socialization has occurred. For example, Snyder (1958) found that intoxication rates for ascetic Protestant and Mormon students are much higher than those of Jewish students. Skolnick (1958) obtained similar results with ascetic Protestant and Jewish drinkers. Mizruchi and Perrucci (1970) explain this phenomena of Jews having a greater proportion of their group drinking yet having a lower incidence of drinking problems than the other groups by reference to the drinking norms of these groups. Drinking norms in the Jewish religion are prescriptive, specifying the manner in which alcohol consumption is permitted in considerable detail. Ascetic Protestant and Mormon groups, however, have proscriptive norms: Drinking is not permitted. When a person reared in a culture with only proscriptive norms violates those injunctions, he does not have available to him the regulatory standards which guide usage and inhibit complications.

If we assume that parents are the primary religious socializing agents for the child, then perhaps Kandel's finding (1973) of greater influence of peers than of parents reflects the decreased influence of religion in contemporary society. Maddox (1970) too argues that interpersonal relationships are more powerful influences on drinking behavior than are religious organizations. In sum, we would expect that the groups whose norms are most salient to the individual will affect most his drug usage behaviors. More attention, therefore, should be directed at identifying these groups and their normative systems.

ASSESSMENT OF DEPENDENT VARIABLES

Drug usage is often measured as a single present or absent behavior involving one or just a few substances, yet it obviously can and should be conceptualized more elaborately if it is to be understood meaningfully in the context of the user's life. In our research on student drug usage (Goldstein, Gleason, & Korn, 1975) we have tried to represent a respondent's past experience with and future intentions toward using all of the commonly encountered psychoactive drugs concurrently. Data on the number of times the substance was used and on the probability of future use, assuming the substances were available, (sometimes supplemented by data on the recency and circumstances of use) were coded into individual drug usage "careers." It was found that intentions predicted usage quite closely for an entire freshman class over an eight-month period.

It was also discovered that the drugs, grouped into eight categories by psychopharmacological affinity, exhibited in a 1968 university-wide sample,a hierarchical scalability: acceptance of a given drug indicated far beyond chance that the respondent accepted all or almost all of the drugs which were less extreme than the given drug. The ordering obtained was: beer, liquor, tobacco, cannabis, depressants (tranquilizers and barbiturates), amphetamines, hallucinogens, and narcotics. Interestingly, when we made paired comparisons of the order of beginning use of all of the drugs by respondent in the senior class of 1972, we found that the only difference in the ordering of the drugs was a reversal of position for depressants and amphetamines.

We analyzed changes in career patterns in one class over the four years of their college enrollment. From the findings of a hierarchy of usage and from the data on future use intentions, it was possible to classify each respondent with regard to his intentions: to stay at his present usage level, to progress to a more "extreme" usage, or to regress to a less extreme drug. Analyses of these career changes revealed that as usage grew in the class over four years their desires for future usage, after an early strong growth, returned to patterns involving only less extreme substances than formerly experienced. Further, comparisons between classes in 1968 and equivalent class years of the Class of 1972 as they went through college revealed that both developmental changes of advancing class year and Zeitgeist or particular social-temporal effects occurred. That is, there was a strong tendency toward new drug use and this increased with advancing class year in 1968; but the usage patterns of the class of 1972 were self-limited. Runaway escalation of usage did not occur.

These changes are for a particular university and for a given four-year period; similar career patterns can be sought in other studies to see if this pattern is a general one. The larger point is confirmed, however, by even this one study. Complexities of usage behavior cannot be discovered by static representations of usage. By designing our surveys and conceptualizing our variables in a manner which permits drug usage to be represented as a dynamic behavior, we have found that this usage is patterned. It is not necessarily a linear extrapolation of initial trends; rather it can and did display substantial self-regulation.

We inquired into the use of a wide variety of psychoactive substances. In so doing we were able to characterize students not only by their frequency of use of a particular drug or drugs but also by the breadth of their usage and even by their intentions toward previously untried substances. From these analyses the concept of the usage career evolved, followed by examination of changes in these careers over time. The inclusion of a range of drugs, from the very common to those only infrequently used, provides for benchmarks in assessing a particular respondent's use in comparison to that of his host population.

Responses concerning even common drugs can sometimes make enigmatic responses about less common drugs easier to interpret. For example, Korn and Goldstein (1973) found that a majority of students in a large university sample thought that liquor was not physiologically addictive. Results of this type make less surprising the incomplete knowledge of respondents about more unusual drugs. Knowledge of drug properties is seldom assessed in student drug surveys, yet such data would provide an opportunity to test certain interesting (and sometimes controversial) hypotheses concerning the relationship between information and usage (Korn & Goldstein, 1973; Stuart, 1974), and it can facilitate the design of informational programs (Goldstein, 1972; 1975).

PERFORMANCE MEASURES

Not uncommonly drug surveys associate usage with value-ladened performance measures. Typically in student surveys the measure of choice (and expediency) is course grades. To obtain a fuller understanding of the effects of usage, a much wider range of such measures must be employed, for example, measures of creativity, independence, participation in activities, and other socially meaningful behaviors. Such measures would help in the assessment in survey research of the "amotivational syndrome" which some have speculated results from sustained marihuana usage (Maugh, 1974).

THE MEANING OF USAGE

We have argued that drug usage is meaningful not when viewed in isolation but only in terms of the role which it plays in the life of the user (Goldstein, 1971). Unfortunately only a small proportion of all drug usage research is aimed at obtaining such understanding, and most of this is based on impressionistic and anecdotal data. A better, more systematic view might be obtained if surveys included items on the circumstances surrounding use, such as when and how the respondent was introduced to and with whom he uses particular drugs, the typical places and social settings of use, and the respondent's view of the role and effects of use in his own life.

Blum (1969) and Ray (1972) provide us with historical perspectives of drug usage, and McGlothlin (1971) has edited an effort at forecasting the future of drug use. Such efforts remind us that drug usage is intrinsic to its social and cultural context. Thus, the future drug researcher will need to keep one ear tuned to trends in the society in which he works as he formulates his questions for future surveys of youthful drug usage. As adolescence changes in nature (Keniston, 1968, 1970) questions which attempt to assess the effects of this developmental stage will also have to change.

In sum, an interactionist view of drug use must be cognizant of changes in both the person and the setting determining the behavior of interest. Indeed that behavior itself will no doubt change radically in the future as new drugs are discovered and as other means of altering consciousness are developed. While such changes are occurring in the world, an optimal and immutable drug usage assessment instrument will not be possible.

SUMMARY

The nature of items on model surveys of adolescent drug usage is discussed in the framework of a person-situation interactionist view of use causation. If drug effects are dependent upon the setting of use, then as assessment of the social norms of the respondent's salient reference groups should be valuable. Usage conceptualized as a dynamic pattern of a range of drugs and viewed according to the role which it plays in the life of the user will be most meaningful. A changing world means that assessments of usage must be periodically reconceptualized.

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NOTES

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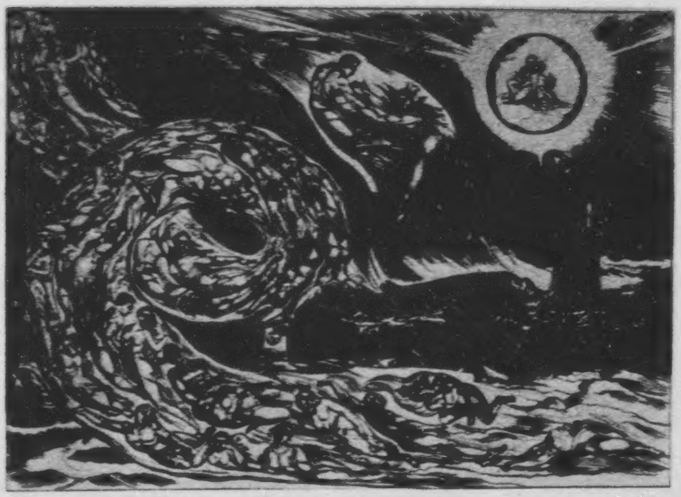

Plate 7

SPECULATIONS ON POSSIBLE CHANGES IN YOUTHFUL LIFE-STYLE BETWEEN THE 1960's AND 1970's

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The expansion of research into drug dependence, which has approximately paralleled the increase in the number of young persons believed to be using licit or illicit drugs in a socially undesirable manner, has recently led to studies which have cited variables of roles, values, and life-styles (Winick, 1973; Johnson, 1973). These variables involve and influence many aspects of the personal and social life of youths, and they reflect the growing interest in a socio-psychological approach to drug dependence which avoids the extremes of undue reliance on the idiosyncratic individual case or an overly cosmic sociological generalization.

A number of the most influential socio-psychological studies of factors in the genesis and continuation of drug use were developed during the 1960's. In many cases, the study design involved the creation of schedules or questionnaires which were administered to populations of young people and then used to identify various aspects of drug dependence.

However, it is important to note that significant changes in social atmosphere may have occurred in the last few years. Such changes could make some of the significant indicators of drug use during the 1960's somewhat less relevant now.

Some notion of the differences in tone between the 1960's and the 1970's may be inferred by an approximation of some of the differences between the decades. One widely quoted report regards the changes in attitudes and values of youth to be an expression of "new morality" (Yankelovich, 1974).

Whatever we call such changes in prevailing patterns of the 1960's as compared with the 1970's, it is reasonable to speculate that they are having effects on whether or not young people use mood modifying substances, by whom, how, when, for what purposes,and under which circumstances they are used.

As a step toward distinguishing the 1960's from the present, ten areas of difference in the social context of life then and now are suggested below. In terms of future studies of life-style in the genesis and continuation of drug use of various kinds, it should be possible to incorporate such differences in social context into the content of schedules and questionnaires. Some items might be added and others might be modified, depending on the direction and nature of the changes in social life.

The ten areas of difference mentioned below are selected, out of many other possibilities, because they may be important to considerations of life style in drug use. In the case of each dimension, a brief comparison is made between the second half of the decade of the 1960's, during which there appears to have been a major increase in psychoactive drug use among young people, and the period of the last few years.

The discussion which follows is based on a wide variety of sources. In order to convey the argument in a manageable format, there is considerable oversimplification. The ten generalizations which follow are intended to be very tentative and examples of the kind of reassessment that students of drug use might wish to consider.

The ten areas within which change has probably occurred are:

1. Antiestablishment attitudes
2. The economy
3. Rock music
4. Experiential emphasis
5. Attitudes toward government
6. Gender confusion
7. Autonomy and ecology
8. Information about drugs
9. Curiosity about drugs
10. Immediacy

ANTIESTABLISHMENT ATTITUDES. From 1965 to 1969, during the very years in which there was an increase in the prevalence of heroin users that has been called an epidemic (Chambers, 1974), there was maximum involvement of the United States in the war in Vietnam. The anti-war sentiment was the most visible symbol of antiestablishment attitudes and of intergenerational imcompatibility and helped to spur a counterculture and a wide range of other activities, manifestoes, meetings, and artistic and relatred expression (Rośzak, 1968).

Attitudinal items related to the war and to other antiestablishment views appear in a number of drug use studies and are, of course, less relevant today. One of the most remarkable features of the American involvement in Vietnam is that it has been forgotten so soon by so many young people.

THE ECONOMY. During the 1960's, the economy was generally expanding. It was a time of relative affluence. Many young people, feeling sanguine about the future, assumed that even if they got into difficulties because of their drug use, they would have a second and perhaps even a third chance.

During the last decade, the general expectation was that nobody in this country would starve. Because such positive views about basic necessities of living were widespread, many young people felt comparatively free to explore the relative luxury of methods of mood modification.

Just as there are said to be few atheists in a foxhole, there are few people willing to "take a chance" in hard times. Today, the combination of inflation and recession has completely changed our economic outlook for the worse. Risk discounting behavior is less likely now than it was in the more optimistic 1960's (Fiddle, 1969). This trend toward more conventional behavior, related to finding satisfaction via the established paths of work and family, has been reinforced by the economic situation. It is likely to express itself in less taking of risks and, thus, less drug use.

ROCK MUSIC. Plato noted, centuries ago, that musical innovations are linked to changes in society. Some studies have concluded that, among college students, political orientation is related to degree of involvement with various musical styles (Fox and Williams, 1974).

The decade of the 1960's represented the peak years of the rock music trend which began in 1954 and is the most successful fashion in the history of American popular music, as measured by the length of popularity of the fashion and the intensity of audience enthusiasm for it. The 1960's were the acme of fame for the Beatles, the single most successful group of performers, who first came to this country in 1964 and disbanded in 1970. A number of famous rock lyrics seem to have dealt with taking drugs and their effects. Some of the leading performers also publicized their own use of drugs. The music became not only a form of recreation but also an ideology and a social movement. There is some uncertainly about the extent to which the rock lyrics reflected a drug subculture or reinforced it, but there is no uncertaintly about the widespread impression among many young people of the music's considerable involvement with drugs.

Practically all of these aspects of the music have changed in the last several years. Most of the famous groups and stars are inactive and young fans are less able to identify with the newer performers. Most significantly, the amount of drug content in rock lyrics of the last few years has dwindled and all but disappeared. The deaths of superstars Janis Joplin and Jimi Hendrix from overdoses certainly discouraged drug use by many performers, and the 1971 Federal Communications Commission prohibition of the playing of drug-related songs on radio stations slowed the dissemination of such music. The music itself is less ideological and less of a social movement, as the showmanship of an Alice Cooper replaces the warnings of Bob Dylan.

EXPERIENTIAL EMPHASIS. During the 1960's, as the result of a variety of factors, there was a turning away from the intellect on the part of some young people. A stress on the experiential and the sensibility was seen as the antithesis of the intellect and as a way of achieving insight and a surer sense of identity. It was felt that intelligence and rationality had not proven their utility and that more direct expressions of the self were healthier. Drug use was often a vehicle for expansion of sensibility and experience.

The most flamboyant guru of drug use as enhancer of sensibility in the 1960's was Timothy Leary, founder of the League for Spiritual Democracy. After founding LSD and creating the slogan "Tune in, turn on, and drop out," Leary was arrested and convicted, escaped from prison and fled to Algeria, returned to the United States, and became a witness for the government in a drug prosecution. Although there is some residue of the Leary interest in the current enthusiasm for transcendental meditation, the turning away from rationality and bureaucracy symbolized by "the greening of America" (Reich, 1970) has become muted.

ATTITUDES TOWARD GOVERNMENT. Among many young people, during the last five years of the 1960's, there was probably a somewhat bimodal distribution of attitudes toward the President and his associates in Washington. There was one group that held negative attitudes of rebellion that were salient and likely to be positively correlated with a variety of behaviors, including drug use. A number of studies reported correlations between drug use and negative attitudes toward government (Suchman, 1969). Another group's attitudes tended to be more supportive of the government. There was a less vocal in-between group.

Today, as a result of the Watergate disclosures and other evidence of government corruption and inefficiency, there is a decline of interest in government and somewhat of a depolarization of attitudes toward it. Both those young people who were opposed to and those who were in favor of government are less likely to be expressing their attitudes. In all quarters there is likely to be less interest in government. Drug use seems to have declined as a symbol of anti-government attitudes.

GENDER CONFUSION. The 1960's represented a period of great confusion over gender identity, with the nascent women's liberation movement receiving much attention (Winick, 1969). In terms of young people, the criss-crossing of items of costume and appearance became an important theme of social life. Some schools debated whether girls wearing trousers should be permitted in class. Boys wearing long hair were foci of discussion, as was the extensive use of fragrance-containing preparations by males. The social and cultural implications of the unisex trend were widely discussed. For a number of young people, the use of mood-modifying substances was one way in which they could deflect or adapt to the complexities of sex and gender confusion. It was easier to relate to a chemical than to a person of the opposite sex or the same sex.

Today, the unisex theme in social life is taken for granted. Costume and appearance aspects of sex are assumed by the other sex routinely. The women's liberation movement has become partly institutionalized. Gender identity has eased as a source of concern to young people. Sex in general is less of a "big deal," and there is less of an incentive or motivational need for young people to take drugs to adapt to sexual confusion.

AUTONOMY AND ECOLOGY. One of the rallying cries of many a young person in the 1960's was the need to "do my own thing" and express individual autonomy in whatever way was most appropriate. This freedom asserted itself in the putative right to ingest whatever chemical substances a youth might wish to try because of a presumed freedom of dealing with one's own body in a manner unfettered by conventional requirements.

Individuals, like groups and nations, are beginning to accept the possibility of serious disaster resulting from the ecological consequences of "doing one's own thing." Interest in ecology has spurred reexamination of the right of the person to ingest whatever he or she wishes if such ingestion has the capacity to cause pollution to the environment of the body. Many young people are more attentive to the social dimensions predicated by their individual behavior.

INFORMATION ABOUT DRUGS. During the 1960's, the drug dependence education being disseminated in schools and colleges was viewed with widespread suspicion and disbelief. As one result of this lack of trust, a large number of underground newspapers, then at the peak of their influence and circulation, carried many different kinds of information on the subject. Thus, the very manner in which drug information was obtained was often related to countercultural publications and themes.

For many young people in the 1960's, their efforts to seek information about mood-modifying substances served similar functions as the search by previous generations for information about sex. Discovering that adults were concealing, hypocritical, and misinforming about sex seemed to cathect the subject (the Godiva Principle) and led to a larger radicalization of youths. In the 1960's, the feeling that adults were concealing, hypocritical, and misinforming about drugs, particularly marihuana, served to cathect the subject and was related to large patterns of questioning the society.

The demythologization of marihuana, which was identified by the National Commission on Marihuana and Drug Abuse (1973) as an important national goal, has been taking place during the last few years. The increased disuse of scare techniques in school drug education, the dissemination of decision-making techniques and broad-based and valid information, along with peer- and value-oriented and small group emphases, have contributed somewhat to the decline of the counterculture as a source of drug information. This decreased involvement with counterculture has had many consequences, one of which could be a decline in youthful drug use.

CURIOSITY. During the 1960's, when there was a dimension of faddism and novelty about illicit drug use, a considerable aspect of the appeal of the situation was its apparent newness. Those young people for whom newness was a relatively central appeal could express their curiosity by looking into the possibilities of a drug situation.

In recent years, the explosion of drug education and the saturation of mass media with the subject has provided almost an overload of information. There are student-run information programs, street theater, public service messages, skits, labs for testing the purity of street drugs, training programs that facilitate "getting high on life," simulation games, phonograph records, teaching machines, and many other new approaches to education. It is plausible to anticipate that curiosity will be a less significant dimension of the motivation for drug use, as questing behavior among young people becomes less important and the drug scene loses its novelty.

IMMEDIACY. When *Time* did a feature cover story on the youth of the 1960's, the subject of the story was dubbed "the now generation." The catchy designation was widely used to describe an interest in immediacy, an almost Dionysian release that was important for many youths. For a number of young people, drug use provided a facilitation of immediacy, a kind of instant achievement.

However, in more recent years immediacy has become a less significant goal. Indeed, there appear to be growing signs that a considerable proportion of adolescents and young adults have reestablished or established their commitment to the "deferred gratification pattern" which was traditionally a sociological characteristic of middle class youths. This postponement of stimuli and rewards is likely to be negatively correlated with drug use.

DISCUSSION

There are, of course, a number of elements of the roles, values, and lifestyles of young people which have not changed appreciably during the last ten years. Such dimensions would probably be relatively constant, in terms of their range, among young people who are drug dependent. In most populations of adolescents and other youths, we may anticipate that the trends noted above will be applicable to substantial components of the middle class population in their use of a considerable range of substances. These approaches will be less relevant to the use of heroin, for example, by ghetto youth.

Since drug dependence appears to be an activity which characterizes a minority of young people, this minority may have attitudes which differ considerably from those of the majority. Thus, we might be making valid comments about the majority of adolescents but the comments could be far less relevant to the minority of drug using youths.

SUMMARY

It is reasonable to assume that there are varying degrees of salience of drug use by young people and that the dimensions of life-style will also reflect a considerable range of salience for young people. The central thesis of this paper, however, is that there will be varying components of youthful life-style and that the last several years, and perhaps the next several years, are sufficiently different from the 1960's to require careful, item-by-item analysis of the ways in which we measure life-style, especially in terms of its relationship to drug use. This hypothesis, like any other assertion about trends in drug use, should be empirically tested so that we can determine the extent to which the "New Values" of the 1960's have been accepted in the present decade.

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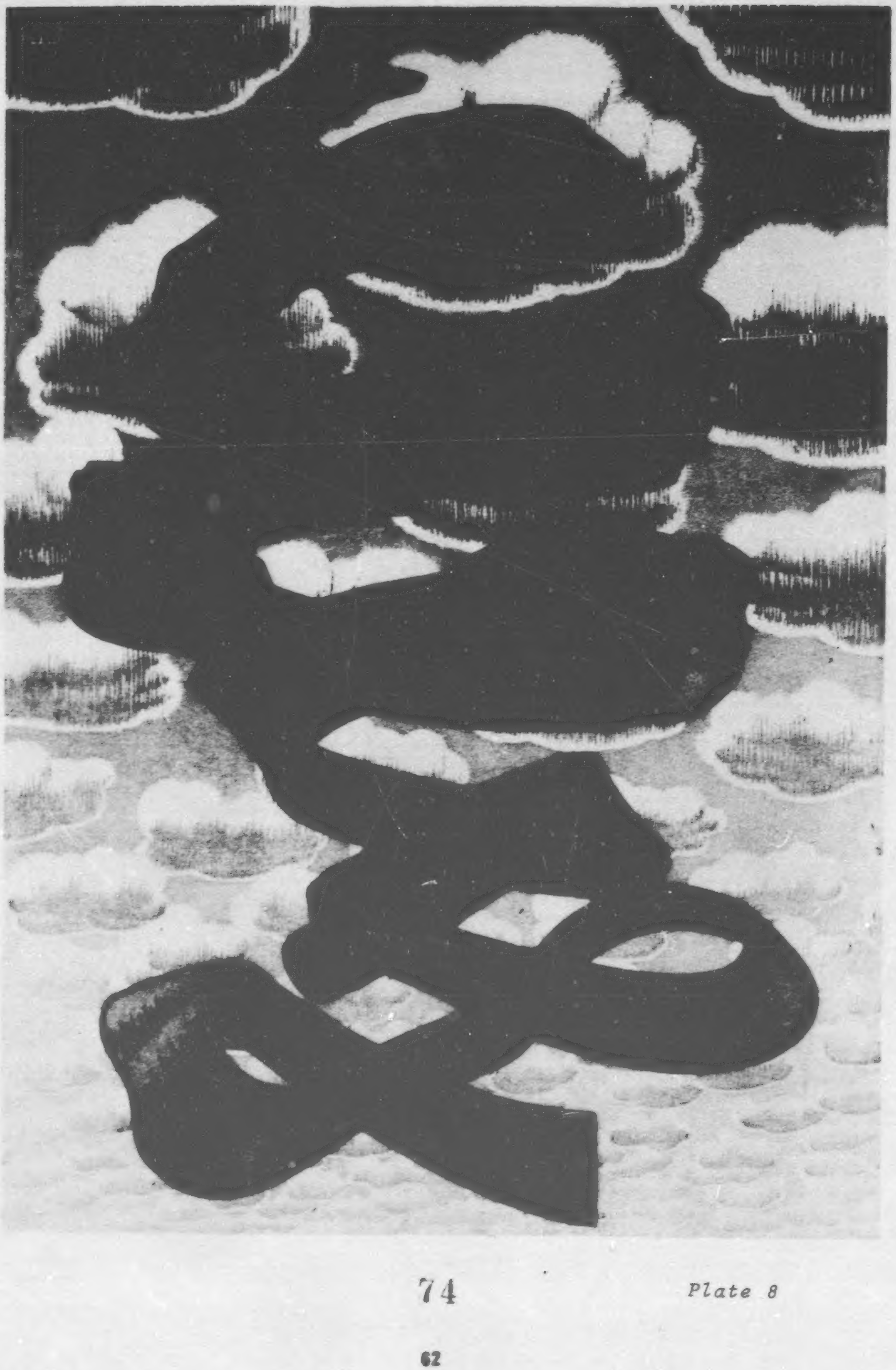

Plate 8

A PSYCHOLOGICAL APPROACH TOWARD THE MEANINGS OF DRUG USE

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From the clinical viewpoint, variables that can be related to the treatment, management, or the education of various target populations tend to be particularly interesting. In order to understand and treat drug use among younger people, the need for useful and clear-cut clinical concepts seems especially pressing. The urgency of this need is highlighted every day by the frustration and the notorious difficulty faced in dealing with young people hospitalized with drug-related or drug-precipitated problems.

In the numerous papers that deal with the correlates of drug use among people aged 25 and under (marihuana, primarily; hallucinogens, amphetamines, barbiturates, and opiates, secondarily), little information is included which could be immediately useful to the clinician or counselor. In the first place, clinically oriented empirical studies of high school age youngsters are scarce. Perhaps, as Carman (1973) has suggested, this paucity is a reflection of the school authorities' fear of adverse publicity. The studies available on high school age groups address themselves primarily to prevalence rates, drug use patterns, and miscellaneous correlates of drug use (see for example Carman, 1973; Hager, Vener, & Stewart, 1971; Kamali & Steer, in press; Lombillo & Hain, 1972).

Studies of young people of college age or slightly older similarly offer some useful information on the prevalence and patterns of drug use. However, the papers that address themselves to clinical aspects of drug use report a bewildering array of symptoms, syndromes, traits, personality types, and life-style characteristics. Although the consequent personality descriptions often seem useful in dispelling negative myths about young drug users, their utility in treatment, prediction, or prevention is dubious. Thus, after a brief summary of characteristic research findings, a way of conceptualizing drug use will be presented which may be of practical value in treatment and counseling. The approach will be taken that continued drug use is contingent upon how the user himself construes the effects of drugs. Moreover, a practical way will be proposed to uncover dimensions on which the user himself assesses the significance of drugs for his life.

Since marihuana use seems to have been a central concern to both the public and researchers alike, and indeed appears to be the most frequently used drug among both high school and college age young people, numerous studies have focused on it.

A prototypical way to investigate the clinical correlates of marihuana use is to compare "users" with "nonusers" on psychometric scales, inventories, or psychiatric interviews. Such studies, generally done on college students, report that users of cannabis derivatives tend to be anxious, bored, cynical, disgusted, moody, impulsive, and rebellious (Robbins, Robbins, Frosch, & Stern, 1970); they tend to be low on scales of socialization, responsibility, and achievement via conformity (Hogan, Mankin, Conway, & Fox, 1970); and they have more difficulty deciding on career goals than comparison groups of nonusers (Brill & Christie, 1974). Moreover, according to Harris (1971), the students who use marihuana are more alienated than the rest of the college population. The college age marihuana users also show somewhat more psychiatric impairment than nonusers (Harmatz, Shader, & Salzman, 1972) and more often display hysterical personality traits as well as "personality aberrations" (Zinberg & Weil, 1970). However, such general characteristics do not seem unique to college age marihuana users; marked "psychopathology" apparently also describes youngsters who sniff glue (Brozovsky & Winkler, 1965).

Additional complexity is introduced by reports that within samples of marihuana users, the subgroup of *"heavy," "regular," "chronic"* users may be differentiated on several variables, including the use of other types of drugs and substances (Brill, Crumpton, & Grayson, 1971; Halikas, Goodwin, & Guze, 1972; Kupfer, Detre, Koral, & Fajans, 1973; Mirin, Shapiro, Meyer, Pillard, & Fisher, 1971). Although there is some variability in the definition of heavy, regular, or chronic marihuana use, at the minimum it refers to drug use at least three times a week (Kupfer, et al., 1973).

A study of volunteers in their 20's reported that only *"chronic"* users regarded their drug use as the most significant determining factor in their life pattern (Zinberg & Weil, 1970). In other papers, *"extensive"* or *"heavy"* marihuana users are described as more hostile and rebellious, with a greater tendency to seek stimulation (Brill, et al., 1971; Mirin, et al., 1971) and with poorer work and interpersonal adjustment (Mirin, et al., 1971) than *"light"* users. In contrast to light users, heavy users more frequently report long-standing emotional problems (Brill, et al., 1971), are more likely to leave college for "emotional reasons" (Brill & Christie, 1974), and tend to be more depressed and anxious (Kupfer, et al., 1973). The college students who"smoke"also have been described frequently as somewhat narcissistic, irresponsible, non-conforming, hostile to rules, and overconcerned with personal pleasure (Hogan, et al., 1970). Although it has been claimed that heavy marihuana use is associated with passive, amotivational personality characteristics (McGlothlin & West, 1968), the Kupfer, et al., (1973) study found no clear support for that notion.

Since heavy marihuana users in the 17 or above age groups are also likely to employ other types of substances, some investigators turned to the *"one drug--multiple drugs"* dimension as a potentially fruitful clinical predictor. The reports generally indicate that, compared to *"marihuana-only"* users, those young people who employ additional drugs tend to show greater psychiatric impairment, especially higher depression and anxiety (Harmatz, et al., 1972), as well as diminished goal-directed activity (Mirin, et al., 1971). Moreover, the *"polydrug"* users have poorer school and social adjustment in the adolescent years (Halikas & Rimmer, 1974) and are characterized by precocious sexual and drug experimentation (Brill & Christie, 1974; Halikas & Rimmer, 1974; Robins, Darvish, & Murphy, 1970). It has been suggested that the precociousness in the history of the polydrug user may reflect a general "sensation-seeking" and "risk-taking" set (Brill & Christie, 1974).

In the search for definitive, discriminant clinical variables, almost limitless research design permutations are possible. Apparent favorites are further subdivisions of a defined drug user group or comparisons of users of different drugs. Unfortunately, the results do not seem unique to any specific drug population. Shader (1972), for example, who looked at continuers and discontinuers of multiple drugs in contrast to a normative reference population, found that the continuers could only be distinguished by higher risk-taking scores. However, with the amount of drug intake controlled, they emerged to be significantly more depressed, anxious and higher on general psychiatric impairment than the discontinuers. In her recent study, Robinson (1973) found that individuals addicted to nonopiate drugs were essentially like the opiate users; both groups were low on self-esteem but high on current satisfaction, with a concommitant lack of motivation to change.

At first glance, the picture of young drug users that emerges from the above-cited studies appears to be a rather negative one. They are characterized as fairly irresponsible, nonconforming, indecisive, bored, anxious, and depressed, with various other psychiatric symptoms. However, this picture is offset by findings that, compared to nonusers, drug users are also more socially poised and emphatic (Hogan, et al., 1970). Moreover, the two groups do not significantly differ in overall characterological structure or general adjustment (Brill & Christie, 1974; Brill, et al., 1971; Kupfer, et al., 1973; Robbins, et al., 1970). The apparent contradiction takes on a different light in view of the fact that most of the studies were conducted on college students (Brill & Christie, 1974; Brill, et al., 1971; Harris, 1971; Hogan, et al., 1970; Kupfer, et al., 1973;

Robbins, et al., 1970) or on volunteers around a university setting (Halikas & Rimmer, 1974; Halikas, et al., 1972; Mirin, et al., 1971). The samples, therefore, consisted of essentially *"functioning"* young people.

Consequently, the generalizability and the applicability of the above-summarized data to the rest of the population of young drug users still need to be explored. For example:

(a) Do the deviant symptoms or traits of apparently functioning subjects also describe the nonfunctioning or marginally functioning young drug user?
(b) Do the deviant symptoms or traits differentiate the users from the nonusers within nonfunctioning or marginally functioning groups of subjects?
(c) Can the empirically derived traits be utilized to develop differential treatment and prevention programs?

Such questions need to be answered before empirical data can be properly utilized in treatment settings. In specific, I would like to stress the need for understanding and characterizing the habituated or psychologically dependent drug user since he is the one who eventually becomes the focus of both societal and clinical concern. Furthermore, if future research shows that labels such as *"narcissism," "immaturity,"* and *"risk-taking"* propensity remain applicable to specific drug user groups, the labels have to be defined in a clinically meaningful way. A descriptive term like "narcissism" is of little substance for the counselor since there are no known practical treatment plans for that quality.

In addition to reporting psychometric or inventory data as well as clinical ratings on drug users, some papers give a cursory description of why young people turn to drugs. Unfortunately, there does not seem to be a prototypic or systematic way in which such data are obtained; some authors offer general notions on the topic, while others report the drug users' own descriptions. Nevertheless, the picture that emerges is rather interesting. For example, according to Harris (1971) drug usage is generally believed to be a form of rebellion or a symptom of alienation from society. Brill & Christie (1974) suggest that while in earlier college student samples marihuana was used to seek *"philosophical truths"* or to *"escape from reality,"* in the 1974 follow-up group it was increasingly utilized as a social *"lubricant,"* as a "way to get high" or a way to relax. Halikas, et al., (1972) have also concluded that the regular pattern of marihuana use indicates its utilization as a *"social intoxicant."* A rather different point of view is that marihuana and other drugs are not used for pleasure but as a way to escape profound depression (Anonymous, 1969; Rado, 1957) or diminish the intensity of unbearable feelings (Wurmser, 1972a,b).

However, asking the drug users themselves about their drug experience yields more colorful data. In two studies of high school students, the most frequently endorsed reason for drug use was to seek *"good"* or *"pleasant"* sensations (Kamali & Steer, in press; Lombillo & Hain, 1972), while in one study goals such as "social enjoyment," the stimulation of creativity, and expansion of consciousness were also cited (Lombillo & Hain, 1972). The Table lists the subjects' reasons for drug use, cited in three additional studies with rather different samples. Many of the entries in the Table seem to overlap, although the Taintor and D'Amanda (1973) paper tried to elicit reasons, the Robbins, et al., (1970) paper described *"goals"* and *"effects"* as well as reasons, and Mirin, et al., (1971) asked for descriptions of a typical marihuana experience.

While the motives given in the Table are not all strictly psychiatric or clinical in nature, they are suggestive of the phenomenology of drug use. Clearly, individuals attach different meanings to and have varied ways of interpreting drug effects.

Since traditional empirical approaches have not yet yielded much in the way of understanding or treating drug problems, a systematic investigation of the phenomenology of drug experience may be worthwhile. General clinical experience with users has indicated that such an approach is not only feasible but also can yield data specific to the

TABLE

Reasons for and Effects of Drug Use Cited by Drug Users

Study	Taintor and D'Amanda (1973)	Robbins, Robbins, et al., (1970)	Mirin, Shapiro, et al., (1971)
Sample	multiple drug user heroin addicts	multiple drug user college students	"heavy" marihuana users - volunteers
Reasons Effects	relieve nervousness	expand consciousness	to get along in the world
	physical pain	increase insight	enhance insight
	withdrawal symptoms	enhance artistic sensitivity	increase sense of harmony
	depression		wish for union with cosmic force
	curiosity	for kicks	
	pleasure	improve condition	increase awareness
	because friends were users	relieve tension	appreciate art
	boredom	ease physical discomfort	to feel more friendly, involved, or agreeable
	physical craving	lessen depression	
		relieve insomnia	
	increase self-esteem	diminish fear of psychosis	
	to get along better		
	to escape problems		
	to relate to another	increase sociability	
	for courage	heighten sexual pleasure	
	to improve sexual relations	curiosity	
	to talk to girls		
	to destroy self		
	to hurt someone else		

core problem of continued drug use. What follows represents an attempt to organize and conceptualize clinical observations obtained in interviews with psychiatric in- and out-patients who were habituated or psychologically dependent on drugs. The observations are restricted to young polydrug users, at the exclusion of primary opiate derivative addicts.

In my clinical work, trying to elicit factors that maintain drug use is more fruitful than searching for variables that initiated or prompted it. Consequently, rather than asking "why" or "for what reason" a person got into drugs, I would ask questions such as: "What are you like when you are not using drugs (or drug X, Y or Z)?" "How are things for you when you are on drugs?" "What is different about you when you are on drugs?" Interestingly, the descriptions I obtained were often similar to the ones listed in the Table.

I pursued this line of inquiry with drug users who differed in many respects. The primary psychiatric diagnoses varied from adjustment reaction of adolescence, drug addiction, neurotic reactions, and latent schizophrenia, to varieties of personality disorders. Some of the patients lived in poverty, others came from reasonably well-to-do families. In spite of their psychiatric conditions, some functioned reasonably in school or at work, while others had chaotic and disorganized life-styles. Some had clear preference for one or two types of drugs, while others would indulge in *"everything"* they could get their hands on. As I asked more and more drug users to describe what they were like "on" or "off" drugs, I noticed the following trends:

(a) persons with essentially the same clinical symptomatology or psychiatric diagnoses often give very different descriptions,
(b) persons with distinctly variant clinical syndromes often relate similar experiences when using or not using drugs,
(c) different individuals who have preference for the same drug can give greatly different descriptions, while
(d) the multiple drug user is likely to emphasize one or two core experiences regardless of the drug used.

These apparent trends suggested that a crucial aspect of drug ingestion and systematic drug use lies not in the clinical symptomatology of the user, nor in the particular pharmacological properties of the substances used, but in the way in which the user construes or labels the effects of drug use; the idiosyncratic meaning the drug effects have for him.

Clearly, a meaning or category label is not inherent in the raw data of experience; it has to be imposed on the experience itself. Moreover, some descriptions suggested that what was construed as a meaningful or core experience when on drugs often implied the lack of the same property in the absence of drug use. For example, the regular marihuana user who singles out "being friendly, involved or agreeable" as a central aspect of being "high" is also saying that, without marihuana, he views himself as lacking ease in relating to people, apparently an important concern. The statement I got from an adolescent boy, that when not using drugs he either feels "empty" or he doesn't "feel anything," speaks for itself. Interestingly, this same youngster said that he does not use drugs (mostly marihuana, *"uppers"* and *"downers"*) to get "high" but "to feel something, anything." The following brief clinical vignettes are offered to illustrate ways in which users have described what they are like on or off drugs and to highlight differences in how drug effects are construed.

Case 1

> M.A., a tall, somewhat unattractive but friendly, 22-year-old single woman from a working class family, described herself as "shy" around people and as always having been rather "nervous." She stated that although she was not "smart enough" she "pushed" herself to get an LPN degree because she likes "helping people." M.A. started to experiment with drugs at age 16 and then became a regular user of marihuana,

barbiturates, and "pain pills." She stated that when she was not on drugs she "couldn't talk to people" and was "always depressed," noting that drugs somehow help her "to function." She spontaneously added that she does not like "being addicted," yet she feels that she cannot "go on living" without them.

Case 2

J.J., a 17-year old, slender, effeminate-looking and childish young man, dropped out of the 10th grade because he was "bored." He subsequently had only one job which lasted one day. He reported that he has been "very unhappy" since his mother's death two years ago, specifically because he feels that his grandmother doesn't like "to put up" with him and because people "don't accept" him since he is "gay." For some time now, J.J. has been systematically sniffing "carbona." He stated that sniffing "makes me feel good" but then added that he also hoped that "one day, it might just happen ... I'll sniff enough to kill me."

Case 3

R.H., an 18-year old, slender, somewhat underweight young man, reported that he was depressed because (a) his girlfriend had left him, and (b) his relationship with his parents had gotten increasingly worse. Around the onset of puberty he started having "problems," the nature of which he could not articulate. He had had several months of training as a mechanic but had been fired from a job a few months prior to this interview. At age 15, R.H. started to experiment with various drugs and became a regular "poly-drug" user. He would shoot heroin for a few months, then stop and "switch" to some other substance: "speed," "uppers," "downers," Valium, etc. He stated that he "got to be" a drug user because he was "depressed." He also stated that when not on drugs, or not high, he feels "uncomfortable with people" and finds that he has "nothing to say." He added, "I just want to stay high."

Case 4

C.H., a tall, very good-looking, soft-spoken 17-year old young man from a well-to-do family, described himself as a "dreamer" who likes to be by himself. For the last couple of years, he felt under "a lot of pressure" to learn to live his own life and decide on a career, all of which made him "very depressed." Although apparently easy going and always a good student, he started having "problems" around age 13: he was fired from a summer job for "drunkenness," drove cars without a license and got into accidents, and had occasionally acute outbursts of temper. At age 14, C.H. started to experiment with marihuana and other drugs as well, all of which he continued to use regularly. After he overdosed on Quaalude, which required hospitalization, he switched over to the almost exclusive use of "grass." When asked what is different about him when on drugs, C.H. stated, "then I am not depressed ... it is an easy way to forget the things that are bothering me."

Case 5

C.E. is a 20-year old, single, fairly attractive woman, who was hospitalized with a depressive reaction subsequent to having been raped. C.E., whose father is a career Navy man, said that she had always wanted to do "something worthwhile" with her life. After graduating from high school and prior to entering a convent for a year, she worked for a social agency where everyone was allegedly a "freak," and she got "turned on" to drugs: "uppers," "downers," "speed," and "grass," the use of which was shared by a newly acquired boyfriend. According to C.E., for months on end she was "constantly high or tripping." She stated that she "liked the feeling" drugs gave her and liked feeling "like a different person." She eventually gave up the use of drugs because after a while "I didn't know who the real C.E. was." Currently, she admits to the occasional use of marihuana.

Case 6

B.B., a 31-year-old, separated mother of two, presented herself as a disheveled, yet attractive-looking woman. She described herself as having "always been self-conscious, edgy and tense," who up to the age of 27 was "a perfect housewife." Although apparently having experimented with barbiturates and tranquilizers before, she got "really turned on" around age 27, at which time an unhappy marriage also ended. For the past four years, B.B. has been floundering, living on DPA or being supported by various men. Although she had used "almost everything," including "speed" and heroin, and has become a "barbiturate addict," B.B. denied any differences in herself or her behavior when on drugs. She stated that she had "freaked out" a number of times on drugs and that she "loved it." She then referred to her drug use as "a way of copping out," but she could not articulate what she meant by that.

An interesting aspect of the above descriptions is the differing points of view on the meaningfulness or usefulness of the drug experience: to feel like another person, not to be depressed, to forget problems, to be high, to be more comfortable with other people. Such verbalizations suggested that the way in which the user assesses the drug experience may illuminate the psychology of drug use. Moreover, it seemed that the categorization of the psychophysiological effects of drugs is probably just one phase on a continuum which, in its simplest form, may be conceptualized as follows:

PHASE 1: EXPERIMENTATION. Social or intrapersonal factors that prompt initial drug use are likely to be relevant in this phase; e.g., accessibility, peer pressure, curiosity, nonconformity. A crucial *psychological* aspect of this phase is that in some manner the individual recognizes, perceives, or acknowledges the novel physiological, perceptual, and other changes within himself which are related to the pharmacological properties of the drug. The novel or unfamiliar sensations must then be assessed by the individual to facilitate their acceptance into or rejection from his usual repertoire of experiences. This leads into the next phase.

PHASE 2: IDIOSYNCRATIC PSYCHOLOGICAL ASSESSMENT OF DRUG EFFECTS. The perception or recognition of novel or unfamiliar sensations calls for an evaluation of the raw data of experience. To accept or reject the physiological concomitants of drug ingestion, the person must construe the basic data of the experience by attaching some meaning, value, or category label to it. I suspect that the manner in which the drug effects are assessed is a significant mediator for or against subsequent or systematic use.

PHASE 3: PERPETUATION OF POSITIVELY EVALUATED DRUG EFFECTS. This phase may be viewed from a *psychological* point of view, the aspects of which, coupled with the physiologically habituating characteristics of some substances, are probably central to systematic or chronic drug use.

However, I suspect that with long-term use the initially positively construed aspects of drug ingestion become secondary or irrelevant. The user may come to view his whole life in terms of drugs and essentially lose sense of what life might be like without them. Indeed, informal observations suggest that even when symptoms of "physiological craving" are alleviated many habituated individuals opt to resume their drug use.

In the present paper I would like to focus on the phase which I designated as the Idiosyncratic Psychological Assessment of Drug Effects. My thesis is that understanding the "meaning" attached to drug effects, or the ways in which individuals categorize such effects, may provide a basis for differentiating between users. Furthermore, such an approach can have practical implications for treatment, prognosis, and prevention. Before going further, I must stress that in Phase 2 of the above-outlined schema I do *not* posit the existence of necessarily deliberate, logical, systematic or fully articulated ways of assessment, nor a long drawn-out process. Assessing or categorizing an experience does not have to be a deliberate, voluntarily induced process; neither do all of its characteristics have to be consciously monitored. That *some* type of assessment or evaluation does take place is clearly indicated by the quality of the entries in the Table as well as the clinical vignettes.

For example, let's take the statement by M.A. (Case 1) that when not on drugs (marihuana, barbiturates, and "pain pills") she (1) can't talk to people and (2) is always depressed. What does she mean? Obviously, she cannot be referring to the basic pharmacological properties of the substances since none of the three has the inherent quality of helping one "to talk to people." It is also unlikely that she is referring to a specific mood elevating, antidepressant property of any of the drugs, since *not* being depressed holds for her marihuana use as well as for her barbiturate and "pain pill" ingestion. According to the three-phase schema outlined above, her drug use would be characterized as follows: In experimenting with drugs, M.A. probably responded to physiological changes brought about by the relaxant or analgesic properties of the drugs. There might or might not have been a fleeting recognition of such changes. Nevertheless, the effects she experienced apparently mediated behaviors of *great importance* to her, i.e., being able to talk to people and not being depressed. Thus, M.A. essentially jumps to construing the drug experience as meaningful and useful for her; the *drugs* help her talk to people; marihuana, barbiturates, or "pain pills" get her "not depressed." The drugs help her function. Essentially, she is saying, "Whatever happens to me when I use drugs is *good*, because it helps me talk to people and not be depressed, both of which are *important* to me."

Based on the various descriptions that patients have articulated, I can delineate at least two dimensions on which drug effects are assessed or construed. One dimension concerns subjective pleasure-displeasure. The other dimension concerns the perceived utilitarian value of drug effects. In other words, the user may or may not construe the drug experience as having a utilitarian or instrumental (useful-useless) value in his intrapsychic or interpersonal life. Thus, the drug user who emphasizes "I *love* to get high" and "when I am high I don't think about problems" has apparently assessed his drug experience on both dimensions: drug use is both pleasurable and utilitarian. On the other hand, the clinical vignette on M.A. suggests that for her the meaningfulness of drugs derive solely from her perception of their utilitarian value. As these diverse examples illustrate, not thinking about problems, being able to relate to people as well as not feeling depressed can all be seen as instrumental in the person's life.

Since the utilitarian value attached to drug effects may touch on diverse phenomena, I would like to expand on it. The entries in the Table as well as the clinical vignettes suggest that what comes to be construed as useful about drug effects can relate to intrapsychic changes and to altered ways of responding to others or the milieu. The individual may decide that drugs are useful for him because he equates their effects with alleviating inner distress, getting away from real problems, enhancing some aspects of the self, improving relationships with others, or frustrating people who are attached to him. From the drug user's point of view, drug effects that have a utilitarian value are also perceived as "positive." However, we can superimpose our own evaluations and categorize the phenomena for which drugs are construed to have instrumental value. The legitimacy of such clinical evaluations can be underscored by the fact that in our society mental health, adjustment, or the capacity to function is assessed either in terms of how well the person is integrated into society and can relate to people or the extent to which he is in harmony with himself.

Thus, from a *clinical* viewpoint we can differentiate between positive utilitarian value and negative utilitarian value. The former would include phenomena which suggest elements generally involved in growth and change: overcoming shortcomings, improving oneself and one's way of relating to others. The latter would include phenomena which are essentially indicative of avoidance or escape: refusal or inability to deal with problems of life, lack of tolerance for core emotional experiences. Since the usefulness of the drug effects can relate to intrapersonal (self-directed) or interpersonal (other-directed) phenomena, a fourfold clinical classification can be applied to their instrumental value:

(a) positive/self-directed
(b) negative/self-directed
(c) positive/other-directed
(d) negative/other-directed

For example, the statement "When I 'smoke' I am not depressed and I don't think about my problems," can be put in the category of negative/self-directed utilitarianism, while "drugs help me talk to people" would be classified as having positive/other-directed instrumentality. To put it another way, the former statement is a negation or a denial, "I do not want to be depressed," "I do not want to think about my problems." The latter is an assertion, "I want to be with people," "I want to talk to people." Since I am essentially in agreement with Wurmer's (1972b) notion that attributing insight, creativity, or expanded consciousness to psychedelic drug use is a romantic "overvaluation of unreflective experince" without any basis in real life, I would view such attributions as escapist and hence "negative/self-directed."

I would now like to give additional illustrations of how the dimensions of assessment (pleasure-displeasure and useful-useless) and the four types of clinical categorizations help conceptualize the phenomenology of drug use. For example, C.E.'s statement (Case 5) that she "liked the feeling" drugs gave her indicates that she indeed has categorized drug effects on the pleasure-displeasure dimension: whatever happens to her when she uses drugs is "pleasureable." Moreover, drug use was also construed on the utilitarian dimension as being "like a different person," which she again found meaningful. Since the statement suggests some denial of or escape from oneself, I would categorize it as "negative/self-directed." C.E., coincidentally, ends up concurring with this clinical evaluation. Even though drug use was initially assessed as both pleasurable and utilitarian, the "positive/pleasure" and "positive/useful" ratings lose their importance when C.E. reassesses her experiences solely as having a negative utilitarian value, "I didn't know the real C.E. was," and consequently ceases systematic drug use.

Based on the case of C.E., I would hypothesize that the "pleasure-displeasure" dimension is secondary to the "useful-useless" dimension in mediating continued, systematic drug use. Her case also suggests that heavy drug use is likely to continue only insofar as drug effects are construed as having a positive utilitarian value.

As another illustration, again let us take the vignette on M.A. In her case we immediately notice the absence of the pleasure-displeasure dimension of assessment. Apparently for her the meaningfulness of drug usage lies soley in its utilitarianism. The drug effects are construed as allowing her not to feel something (i.e., depression), as well as mediating goal-directed behaviors on which she clearly puts a great deal of value (i.e., talking to people). Thus, M.A. attributes at least two different meanings to her drug experience: one is negative/self-directed and the other is positive/other-directed.

I would like to take the position that exploring the meaning of the drug use for the young drug user may be of heuristic value in therapy and rehabilitation. For example, once we can systematically isolate the goals for which drug use is of instrumental value, we may be able to devise and offer viable, alternate ways of achieving them. I suspect that individuals for whom positive/other-directed elements are central in drug usage and those for whom usage is maintained by negative/self-directed utility would respond to different helping efforts. For example, the youngster who describes his drug ingestion in terms of "wanting to feel something, anything" or in terms of not wanting to be bored (negative/self-directed) is essentially revealing his own poverty of emotional and psychological resources. Such a person would probably be a poor candidate for traditional, verbal psychotherapy or counseling. On the other hand, he may respond well to a structured program which clearly specifies activities, duties, and interactions in which he would be required to participate.

However, such a structured environment might be of little therapeutic value to the person who finds drug use meaningful because he feels that drugs help him "talk to people" or help him "relate better" (positive/other-directed). For such an individual, counseling or therapy may focus on some basic, practical issues such as:

(a) What is important about talking to people or relating to them?
(b) Why are those goals important?
(c) What are alternate ways of accomplishing those goals besides indulging in drugs?

The conceptual scheme outlined in this paper also lends itself to empirical investigation. As a first step, a systematic survey of large samples of drug users may be undertaken to elicit phenomenological components of drug use. The subjects can be requested to respond to one or more of the following questions:

(1) Describe what is different about you when you are on drugs or when you are "stoned."
(2) Describe what you are like when you are not on drugs or when you are not "stoned."
(3) Describe how things go for you when you are on drugs or when you are "stoned."

As a second step, raters could be trained to isolate components of the descriptions that imply utilitarian or instrumental value. A reasonable level of inter-rater agreement should be reached in assigning the abstracted items to one of the four clinical rating categories: positive or negative, self- or other-directed. Thus, the utilitarian components of drug experience can be used to make up a list which may then be administered to other samples. The list might comprise statements such as:

1. To feel comfortable around people
2. Not to think about problems
3. To feel like a different person
4. Not to be depressed
5. To talk to people
6. Not to be nervous
7. To get along in life
8. Not to be bothered by things
9. Not to have physical pain
10. To be happy
11. To get back at somebody
12. To have fun, etc.

Next to each item, the following scale could be printed:

. . . .
Very useful Neither useful Very useless
nor useless

The list can be introduced by a statement such as: "Different people have different experiences when they are using drugs. First, think about your overall drug experiences and indicate on the following rating scale how pleasurable the experiences have been for you:

. . . .
Very pleasurable Neither pleasurable Not pleasurable
nor unpleasurable

"If, in general, your drug experiences have given you a sense of pleasure, pick the point on the left side of the scale which indicates how pleasurable they have been; if you do not experience any such effects, circle the middle line, etc. Indicate your answer by circling the line on the scale that best applies to you.

"Next, you will find a list of sentences which describe goals, or experiences. Next to each sentence there is a scale that goes from very useful to very useless. Read each sentence and on the scale next to it mark down whether drugs seemed useful to you in feeling or acting the way described in the sentence."

It might also be useful to ask the subjects to pick out the three statements on the list that describe feelings or experiences most important to them. The data can then be used to test various hypotheses, such as:

(1) Utilitarian value attached to drug effects will be more predictive of continued drug use than the pleasure value.
(2) Pleasure value will differentiate between occasional and habituated drug users.
(3) Negative/self-directed utilitarian value will be associated with poorer prognoses than positive/self-directed value, in terms of cessation of drug use or the likelihood of remaining in treatment.
(4) Positive/other-directed utilitarianism will be associated with better clinical prognoses than any of the other three clinical rating categories.

In summary, my impressions are that the clinically oriented literature currently available on the young drug user offers little of immediate and practical utility to the clinician and counselor. Moreover, it is probably worthwhile to invest more effort in trying to differentiate between the drug users who are able to cope with life's problems and those who are only marginally functional or totally unable to meet life's demands. I am advocating that more research and clinical efforts be directed towards the habituated or systematic user of drugs, since he is the one who is most likely to be the focus of societal and clinical concern.

In the meanwhile, I feel that a useful and practical way of understanding and categorizing drug users is to focus on the phenomenology of the individual user. Since my clinical experiences indicate that individuals attach differing meanings to the drug effects they experience (irrespective of the nature of the drug or the clinical symptomatology of the user), this psychological component seems worthy of further exploration.

Moreover, I have suggested that the attribution of meaningfulness to drug effects often centers on what the user idiosyncratically construes as the utilitarian or instrumental value to be derived from drugs. It also seems that the kind of utilitarian value the user assigns to drug effects is probably an important mediator for or against subsequent or habitual drug ingestion. A clear and systematic conceptualization of the instrumental value of the drug use could be of practical help in the design of suitable treatment and rehabilitation plans.

SUMMARY

An important psychological component of continued drug use is the way in which the user himself construes the drug effects. By asking individuals to describe what they are like both "on" and "off" drugs, it is possible to isolate dimensions on which each individual assesses the significance of drug use. It is proposed that the idiosyncratic utilitarian or instrumental value assigned to drugs greatly influences subsequent use or disuse. The implications of this conceptualization for treatment, rehabilitation, and empirical research are discussed.

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AN APPROACH TO THE CLASSIFICATION OF THE LIFE-STYLES OF NARCOTIC ABUSERS

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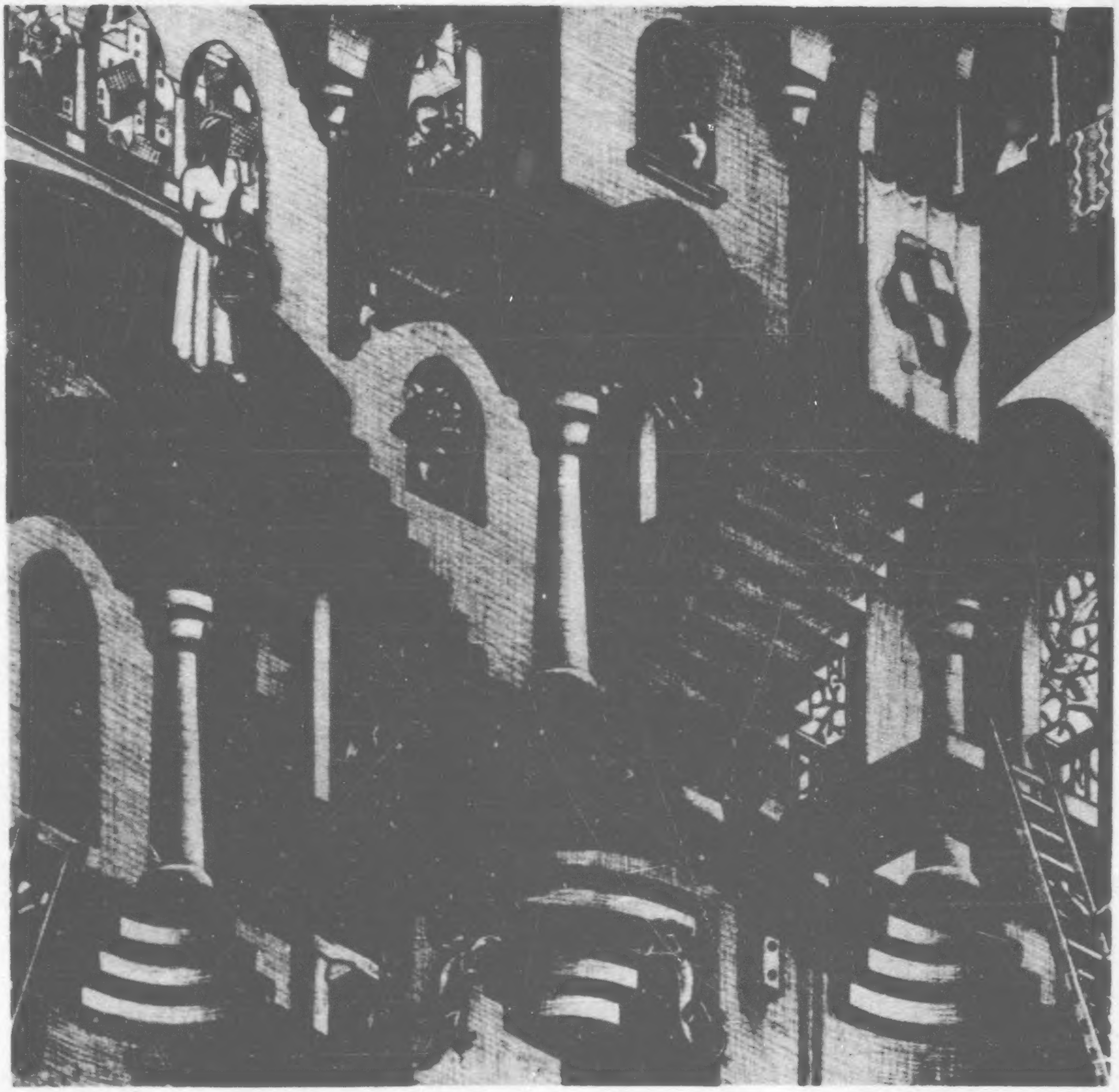

Plate 9

AN APPROACH TO THE CLASSIFICATION OF THE LIFE-STYLES OF NARCOTIC ABUSERS

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CONCEPTUALIZATION

A feature common to both professional (scientific) and lay (popular) discussions of drug abuse, especially of narcotic addiction, is the tendency to regard individuals so addicted as belonging to a more or less homogeneous class or grouping. This "assumption of uniformity" is sometimes explicit, as in newspaper discussions of the "heroin addict," but it is more likely to be implicit, as in research involving the delineation of "addicts" from "non-addicts" by means of psychological test responses (Cavior, Kurtzberg, & Lipton, 1967; Lombardi, O'Brien, & Isele, 1968).

While the practice of lumping narcotic abusers into a single category may have some merit as a rough form of classification within a larger nosological scheme, developed primarily for record keeping and/or law enforcement purposes, it has little to recommend it from the standpoint of etiology, current status, prognosis, theory, or potential for rehabilitation. As is noted in a recent federal strategy statement (Strategy Council, 1973), narcotic abusers are a very heterogeneous group; and effective approaches to their treatment must take full cognizance of this diversity.

One early approach to meaningful subclassification that still enjoys a certain degree of currency is categorization according to the particular substance abused. Thus, one encounters subdivisions such as heroin addicts, cocaine abusers, glue sniffers, psychedelic users, and soft drug (nonnarcotic) abusers. Again, while such a gross system of classification may have some limited practical utility from a record keeping standpoint, it falls far short of the ideal or even of the achievable.

Relatively few typologies of narcotic abusers, other than the relatively trivial ones mentioned above, have been attempted so far. Moreover, the few attempts that have been made have suffered from one or more serious shortcomings, including limitations of scope (restrictions in terms of addict diversity), limitations in terms of data base (e.g., classification on the basis of a single instrument or technique), subjectivity of judgment and classification, and faulty analytical methodology.

One system of classification which may have considerable preliminary promise is that of "life-styles" (Feldman & Thielbar, 1971). For present purposes, life-style may be defined as the whole constellation of behaviors centered around the various ways in which individuals define and pursue their central life interests. For the deviant individual, the deviancy itself and the pursuit of the means necessary to sustain this deviancy often become the central life interest or major social role.

Despite the current high level of public interest in and concern with drug addiction as a social problem, relatively little is known about the life-styles of addicts and, to the best of our knowledge, no theoretically refined or empirically validated typologies of these life-styles have been developed.

For most individuals, central life interest may be synonymous, or nearly so, with the nature of their occupation or their level of occupational aspiration, the level of educational attainment required to pursue their present or intended future occupation, and the income and other rewards they receive from it. The central life interest, also, is likely both to determine and to be dependent on the individual's values and the ways in which he participates in various primary and other social groups and relates to significant others.

Demographic and social characteristics (race, sex, age, marital status, living arrangements, and so on) may each play a role in determining the central life interest while the latter, in turn, may greatly influence marital status and living arrangements, the meaning to the individual of his membership in a racial group, and his age and sex roles.

The concept of central life interest appears to involve a dominant emphasis on a single activity. Feldman and Thielbar (1971) make this point succinctly: "A distinct life-style is evident when a single activity or interest pervades a person's other interests and unrelated activities--drug addict is an extreme example."

These authors also cite other examples of a central life interest, such as avid baseball fans, television enthusiasts, professional San Franciscans, and astrologers. However, it should be noted that many of the examples they cite are not occupations but activities, e.g., leisure time activities, deviant activities, memberships (in a group), or identifications (with some larger collectivity). Drug addiction as a distinct life-style is one of the activities they cite.

What are the central life interests which tie together the major items of behavior, norms, and values to constitute a life-style and render it distinctive? Marx (Gerth & Mills, 1946) believed that the individual's relationship to the means of production was the sole determinant of his patterns of consumption and, in fact, of all else that was significant in the individual's life--his ideology (Weltanschauung), personality, and so forth. Thus, the "objective reality" of the individual's economic position ultimately determined all else, although later in his life Marx admitted the possibility of "false consciousness" perhaps playing a significant role, at least in an individual's ideology.

On the other hand, Max Weber (Gerth & Mills, 1946), who introduced the concept "life-style" into the sociological literature, believed that subjective elements might significantly modify Marx's "objective reality," perhaps even to the extent of determining a person's life opportunities, i.e., his chances of achieving economic reward. Clearly, this is a relationship which deserves further investigation. Whatever the case, both Marx and Weber were speaking essentially of the "normal" individual whose central life interest is to "earn a living" or in other ways to satisfactorily meet the obligations of his major social role (e.g., providing for a family for a man, childbearing for a woman, obtaining training or education for a child, and using leisure time for retired individuals).

The point of view taken here is that for a "deviant" individual, the deviancy itself and the pursuit of the means necessary to sustain the deviancy often become the central life interest or major social role. This may be particularly true for narcotic abusers (as opposed to alcoholics, homosexuals, and sexual perverts) because of the illegal nature of the activity and the consequent enormous expense involved in securing the drugs. It is suggested here that this aspect of "objective reality" sets constraints on all other aspects of an abuser's life activities, determining within broad limits the nature of his job, family relationships, and other aspects of life. However, we believe that narcotic abusers differ in the degree to which they are invested in drug taking as a central life interest and the degree to which drug taking constrains their other life activities.

Within the broad category of drug abuser life-style, several major varieties have been proposed. For example, Stephens and Levine (1971) and Preble and Casey (1969) have written about the "street addict role," the sets of behaviors characteristic of minority group slum dwellers who use heroin and adhere to a deviant set of norms and values. These addicts are variously referred to in the literature as "righteous dope fiends," "cool cats," and "junkies." Stephens and Levine contrast these backgrounds and psychodynamics with those characteristic of some white, middle class, "hippie" youngsters who "experiment" with addictive drugs and with those characteristic of "medical" addicts, i.e., chronically ill persons whose addiction may have originated during treatment and for whom its continuation depends upon the medical profession's willingness to serve as the source of supply. Hamburger (1969) similarly presents data contrasting the life-styles of "hippies" with those of "junkies" in terms of their area of location, sex, age, race, socioeconomic origins, patterns of drug abuse, external appearances, employment, leisure time activities, philosophy, and psychiatric patterns.

The three varieties identified by Stephens and Levine (the street addict, the white, middle class hippie addict, and the medical addict) by no means exhaust the possible variety even of major drug addict life-styles. Based on the testimony of "informed" individuals, persons intimately acquainted with the drug subculture, and based on preliminary interviews conducted with a large number of addicts, at least the following varieties of drug addict life-style (Nurco, 1973; Nurco & Lerner, 1974) can be enumerated:

- The Street Addict
- The Dealer Addict
- The Shooting Gallery Addict
- The Female Addict
- The Suburban Addict
- The Employed Addict
- The Addict Under Treatment

Our informants believe that each of these represents a distinctive "manner" of being an addict, where the fact of addiction differs in its centrality to the current mode of adapting to the "straight" world. This manner may have implications for the separate items of behavior, norms, and values which comprise his life-style. However, the above typology is essentially behavioral, i.e., the categories listed in it may represent nothing more than the behavioral manifestations of a smaller number of social-psychological "types." They may represent no more than mode and degree of access to the drug, or they may reflect accidents of demography and social status. In sum, they are admixtures of classification approaches and do not flow from a consistent theory or set of dimensions.

The virtue of this characterization of seven narcotic abuser types is that it provides some insight into the "topography" of the phenomena as well as some guidance in our attempts to sample a current population of narcotic abusers.

An alternative formulation, perhaps more basic than the preceding one, involves the notion of central life interest and its theoretical concomitants. This formulation postulates that narcotic abusers vary in the degree to which drug taking is or has become their central life interest and that these variations will affect the production of financial resources, namely, the amount of resources produced, the disposition of the resources (including their excess above and beyond the requirements of drug procurement), the manner in which resources are produced, and the qualitative characteristics of the activities involved. An additional consideration is the amount of total time and effort devoted to drug taking, drug procurement, and related activities relative to the time devoted to nondrug-related, interpersonal relations and the fulfillment of conventional social obligations. One interesting possibility is that the production of resources by some abusers may be impulse oriented as opposed to being characterized by the ability to defer gratification. Thus, as we begin to address questions such as these, we move closer to more practical issues. For example, who uses what sources and in what way are the sources used? A major aspect of this is, are there narcotic abusers who choose treatment and others who do not?

RATIONALE FOR THE SELECTION AND ORGANIZATION OF INTERVIEW ITEMS

The challenge of proposing alternative formulations of problems lies in the development of data collection instruments that will provide support for the theoretical perspective. The focal concept in the approach proposed here is the notion of central life interest. Summarily, we postulated that an individual's ordinary life activities will be not merely affected but ordered by the extent to which drug taking has become his central life interest and by the manner in which he acquires the resources to obtain drugs. The term "ordinary life activities" includes making a living, social interaction, and conventional amenities of everyday life such as personal hygiene, eating, sleeping, and sexual relations.

For this reason, we organized our data collection instrument around drug-taking activities of the subjects. In doing so, we specified what was to be considered drug taking in an operational sense. Since our main concern is narcotic drugs (opiates plus their derivatives and synthetics), we focused on these.

In order to distinguish between an addict and an experimenter or "chipper," we defined "regular" narcotic use as daily or almost daily administration of narcotic drugs for periods of one month or longer. Periods of time during which the subject used narcotics on a daily or almost daily basis for a period of one month or more were considered "on periods." Intervals during which the subject used narcotics less frequently or for less than one month were considered "off periods." In this way the subject's life could be divided into a series of on/off periods, starting from his first experimentation with narcotic drugs and extending to the time of the interview.

The notion of central life interest implies a commitment of time, effort, and resources (economic and others) to the pursuit of one thing above or before all others. Thus, we collected data that would allow us to analyze the extent to which drug taking and its associated activities dominate the everyday life activities of the subject during both on periods and off periods. Differences between the on and off periods in terms of committing time, effort, and resources to drug taking rather than to the more conventional activities of everyday life provided the empirical basis needed to develop the central life interest formulation.

Six areas of activities were examined. Two of the six are related to drug taking and drug selling, activities which are specific to a drug-taking population. The other four activities, legitimate economic activity (work), criminal activity, living arrangements, and other sources of income, are relevant to the general population. Our purpose in selecting these particular areas was to see how drug-taking activities related to the subject's more conventional life activities.

In each of the six areas on which data were collected a number of specific dimensions were selected for investigation. In regard to drug use, this information included the nature of the drugs being used (narcotic vs. nonnarcotic), the amount of the drug used, the cost per unit of the drug, how it was used (alone, in combination, as a substitute), how often it was used, and for how long. In addition, a number of questions about drug-dealing activities were also developed. They concerned the time during the period when the individual was dealing, the amount of time he dealt, and the amount of money and/or drugs he received as the result of his dealing.

Three dimensions of legitimate economic activity were examined: the type of occupation, the length of time the respondent held the job, and the average weekly pay for that job. Data on several dimensions of illegitimate (criminal) economic activity were also collected. Items were developed to elicit the type of crime (i.e., burglary, shoplifting, forging checks, and so on), the frequency with which criminal activity was performed, whether the individual committed crime alone or with one or more accomplices, and the approximate monetary payoff resulting from criminal activity. A third area of investigation concerned other sources of income. These other sources included welfare payments and assistance from social services agencies, family, friends, and other relatives, as well as income from gambling, playing pool, and support from "employees" and other "generous persons." Further inquiry was made about the total amount of money derived from these other sources and the length of time during which that money was received.

The final area of interrogation for each on and off period involved the subject's living arrangements. A number of dimensions were explored: the type of residence (apartment, house, or room), who owned it or paid the rent, where it was located, and with whom the subject lived in each place. Questions were asked about whether or not the subject's living companions used or dealt drugs. It is important to remember that all of these data were collected about every individual in regard to every narcotics regular use (on) period and every narcotics nonregular use (off) period.

In the last section of the interview, data were collected about a typical day in the life of the subject. In the case of subjects who were institutionalized at the time of the interview, inquiry was made about the last typical day before their loss of freedom. For respondents out on the street, the day before the interview or the last usual kind of day was used as the referent. Our intention in collecting information about how the subject spent a typical day was to determine how he used his time, effort, and resources. With the exception of drug-taking activities, the areas of interrogation were general enough to apply to nearly any person, whether or not he was a narcotic drug user. The areas inquired about were economic activity (both legal and illegal), sleeping, eating, personal care and dressing, sexual activity, and other leisure activities performed on the typical day. We were interested in determining whether or not the subject performed the activity in question at all; if so, during the course of a 24-hour period when he engaged in that activity and how much time he spent at it.

The final dimension concerned the persons with whom the subject performed the various activities. Of interest here was whether the subject's companions during the day were relatives, friends, men, women, active or former drug users, or "straights." The number of each of these categories of persons and the total number of persons permitted estimates about with whom the subject spent time on a typical day.

The interview items cited above have been administered to 267 respondents, persons identified by the Narcotic Squad of the Baltimore City Police Department as narcotic users during the period 1952 to 1971. While extensive analyses have yet to be conducted, we believe that various combinations of these dimensions will allow us to elaborate a set of specific addict types.

PRELIMINARY VALIDATION - INTERVIEW ITEMS FROM THE "TYPICAL DAY"

In order to determine in a preliminary way whether the questions constructed about the "typical day" (see Appendix) tapped a wide range of behaviors, we extracted information from several interviews. We present below some examples of eight subjects' responses to selected areas of the questionnaire, particularly as they pertain to economic activity, eating meals, and spending time with family. Four of these respondents were white and four were black. Of the eight, four were currently using narcotics (two black and two white respondents), and four reported that they had not used narcotics within the past five years (two black and two white respondents).

Respondent #277 is a black male, 29 years old, who currently uses narcotics daily. He first began daily use of heroin at age 18 and has continued daily use through to the present time. During these 10 years, he has maintained one continuous period of daily use characterized by intermittent attempts to withdraw; the longest period of abstinance was less than one month. At this time, his typical day's activities center around his narcotic use, four times a day, generally in the company of addict friends in the street. His economic activity, in which he spends 4-6 hours daily, is devoted to the illicit sale of narcotics. His other daily activity is eating one meal at midday in the street. He reports spending two hours of the day with his family..

Respondent #270 is also a black male who currently uses narcotics daily. He is 45 and began regular use of narcotics at age 35; thus, his history of daily heroin use includes approximately 10 years. The first 8 years were a period of continuous use while the other two consisted of three periods of use, 6 to 12 months in duration, interrupted by short periods of incarceration. His typical day's activities include drug use, three times a day, at home and generally alone. His economic activities are illicit: he spends three hours a day shoplifting. This respondent's daily routine also includes one meal a day, usually in the evening, at the home of and in the company of a female friend. However, no time in his day is set aside to be spent with family members.

In contrast to the two men described above, respondent #95 currently is not using narcotics daily and has not done so for the last 15 years. He is a black male, age 44, who began daily narcotic use at age 20 and continued use for approximately six years. Within these years of daily heroin use are three distinct periods of addiction, each one lasting approximately 18 to 24 months and interrupted only by periods of incarceration. The last period of drug use occurred at age 26. In further contrast, the typical day's activities of respondent #95 currently include neither the use of narcotics nor the use of alcohol. His economic activities are legal; he works eight hours daily with persons he considers friends who neither use nor ever used narcotics that he knows of. His daily habits include eating an evening meal at home with family members and eating breakfast and lunch at his work location. Typically, he spends his evenings at home with the members of the family with whom he lives.

Like respondent #95, respondent #118 currently is not using narcotics. He is a black male, 46 years old, whose history of narcotics is quite brief. He first tried narcotic drugs at age 31 and last used them seven months later. He used heroin weekly and never progressed to daily use. This respondent's current typical day does not involve use of either drugs or alcohol. He is gainfully employed in a licit activity, working 10 hours a day with co-workers who have never had ties with drug use. His daily routine includes eating two meals a day at home, in the afternoon with a member of his family and in the evening alone (because of his irregular working hours). However, he generally spends most of the evenings (four to six hours) at home.

Respondent #266 is a 28-year-old white male who currently uses narcotics daily. He first began daily narcotic use at age 19 and has continued daily use for about four years. During these four years he has used a wide variety of narcotics during six separate periods of use. Each period has lasted 6 to 12 months, interrupted by moderately long periods of incarceration. This respondent's daily activities center around his drug use, which usually occurs three times a day while he is in the company of one or more other narcotics users in public places such as clubs or bars. He spends a few hours a day in illicit economic activities ranging from shoplifting to armed robbery, usually with a fellow addict. His daily routine includes eating one meal a day in the evening. He devotes no time to his family.

Respondent #332 is a white male. Like the preceding respondent, he currently uses narcotics actively, although no longer on a daily basis. He was 17 years old when he first began daily use; now he is 26. During six of the past ten years he has used narcotics daily. The first three years were a period of continuous use, followed by another continuous run of two years. In each case, his reason for stopping daily use was voluntary withdrawal. Nevertheless, he has continued to use narcotics but no longer on a daily basis. However, his typical day now includes the use of alcohol. This respondent reported no time devoted to economic activity, either legal or illegal. His daily activities include one meal a day, usually eaten alone, and generally he spends his time with friends who are most likely to be narcotics users. He spends no time with family members.

In contrast to respondents #266 and #332, who are using narcotics currently, respondent #43 has not used them for 21 years. He is a 42-year-old white male who first began daily use of narcotics at age 19. His involvement with narcotics was very brief, lasting less than two years; each daily use period within this time lasted only 6 months and was separated by 6-month periods of voluntary abstinence. The typical day's activities of this respondent are free of any drug or alcohol use. He is responsibly employed, working 10 to 12 hours a day with co-workers who are not active drug users. He eats three meals a day, in the morning and in the evening at home with his family and in the afternoon on the job. Although he maintains long hours on his job, he manages to spend his evenings at home with the members of his family.

Respondent #47 is another white male who currently does not use narcotics and has not for 13 years. Now 38 years old, he was 18 when he first began to use narcotics daily. These two years of daily use consisted of two periods, each lasting approximately 10 months. These periods were characterized by a wide variety of drugs and included various attempts at treatment and abstinence as well as incarceration. This respondent's current daily activities, like those of respondent #43, are in direct contrast to those reported by current daily users. Respondent #47's typical day includes no drug use at all. His economic activities are legal: he spends 6-8 hours a day handling the responsibilities of a semiprofessional position. He takes three meals a day at home with members of his family and also spends his evenings at home with his family when possible.

SUMMARY

This paper presents the conceptualization for a study of the life-styles of drug addicts. It proceeds from the premise that for a "deviant" individual the deviance itself and the pursuit of the means necessary to sustain the deviancy often become the central life interest or major social role. To the extent that drug taking has become an individual's central life interest, and in accordance with the manner in which he acquires the resources to obtain drugs and has an excess of resources over and above drug-taking needs, other life activities will be affected.

A questionnaire administered to 267 narcotic addicts included items intended to throw light on life activities, using them as dimensions of life-styles. Descriptions of these activities in the daily lives of eight subjects are included here as examples of the wide range of those activities in the life-styles of narcotic addicts.

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APPENDIX

"Typical Day" Questions

Extracted from Interview Schedule

used in

Analysis of a

Community Wide Population

of Narcotic Abusers[*]

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Item # Item

54A-62C FOR Rs. IN AN INSTITUTION ASK ABOUT LAST TYPICAL DAY BEFORE ENTERING INSTITUTION.

54A I would like to know something about how you usually spend your days. Was yesterday a fairly typical day for you or was it an unusual one, unlike the way you spend most of your days?

a. Typical ...... 0 ___ (Go to Q. 54c)
b. Unusual ...... 1 ___

54B What was the last day that you would say was typical of the way you spend your time?

____

54C What time did you get up on (LAST TYPICAL DAY)? ________

And what time did you go to bed for the night? ________

54D On (LAST TYPICAL DAY) how many times did you use drugs or take a drink of an alcoholic beverage, no matter how small the amount? ________ (Ask Qs. 54F, G & H only for drugs, not alcohol)

None ___ (Go to Q. 55)

54E When was the (first/next) time? About what hour of the day?

A.M. A.M. A.M. A.M.
___ P.M. ___ P.M. ___ P.M. ___ P.M.

54F About what time did you start looking for your man? EACH TIME

A.M. A.M. A.M. A.M.
___ P.M. ___ P.M. ___ P.M. ___ P.M.

___ Had It ___ Had It ___ Had It ___ Had It

54G How long did it take you to make your connection and take the drug? EACH TIME

Mins. Mins. Mins. Mins.
___ Hrs. ___ Hrs. ___ Hrs. ___ Hrs.

54H Where were you when you actually took the drug? EACH TIME

________ ________ ________ ________

54I How many people were you with? EACH TIME

___ People ___ People ___ People ___ People

54J How many were women? EACH TIME

___ Women ___ Women ___ Women ___ Women

54K How many are using drugs currently? EACH TIME

___ Users ___ Users ___ Users ___ Users

54L How many are former users? EACH TIME

___ Ex-users ___ Ex-users ___ Ex-users ___ Ex-users

Item # **Item**

54M How many of these people were related to you? EACH TIME

______ Relatives ______ Relatives ______ Relatives ______ Relatives

54N How many were close friends? EACH TIME

______ Friends ______ Friends ______ Friends ______ Friends

54O What did you do right after you took it? EACH TIME

______________ ______________ ______________ ______________

54P For how long did you do that? EACH TIME

Mins. ______ Hrs.	Mins. ______ Hrs.	Mins. ______ Hrs.	Mins. ______ Hrs.

55A How much of your day did you spend on (LAST TYPICAL DAY) engaged in activities that resulted in financial gain for you, be it legal or otherwise? How many total hours did you spend?

______ Hours

None ___ (Go to Q. 56)

55B At about what time in the day did you pursue these activities?

From ______ A.M. P.M.	From ______ A.M. P.M.	From ______ A.M. P.M.	From ______ A.M. P.M.
To ______ A.M. P.M.	To ______ A.M. P.M.	To ______ A.M. P.M.	To ______ A.M. P.M.

55C What were you doing?

____________ ____________ ____________ ____________

55D Which of these were/was this a) legal pursuit(s)?

Yes ___	Yes ___	Yes ___	Yes ___
No ___	No ___	No ___	No ___

55E How many people were you actually with, when you were doing this? EACH TIME

______ People ______ People ______ People ______ People

55F How many of them were women? EACH TIME

______ Women ______ Women ______ Women ______ Women

55G How many of them are using drugs currently? EACH TIME

______ Users ______ Users ______ Users ______ Users

55H How many of them are former users?

______ Ex-users ______ Ex-users ______ Ex-users ______ Ex-users

Item #   Item

55I How many of these people were related to you? EACH TIME

______ Relatives ______ Relatives ______ Relatives ______ Relatives

55J How many were close friends? EACH TIME

______ Friends ______ Friends ______ Friends ______ Friends

56A How many times did you sit down at a table or a counter to eat a meal on (LAST TYPICAL DAY)?

________ Times

None ___ (Go to Q. 57)

56B When during the day did you have something to eat?

From ______	A.M. P.M.	From ______	A.M. P.M.	From ______	A.M. P.M.	From ______	A.M. P.M.
To ______	A.M. P.M.	To ______	A.M. P.M.	To ______	A.M. P.M.	To ______	A.M. P.M.

56C Where did you get that something to eat?

Home	1____	Home	1____	Home	1____	Home	1____
Mother's	2____	Mother's	2____	Mother's	2____	Mother's	2____
Girl's	3____	Girl's	3____	Girl's	3____	Girl's	3____
Restaurant	4____	Restaurant	4____	Restaurant	4____	Restaurant	4____
Friend's	5____	Friend's	5____	Friend's	5____	Friend's	5____
Other	________	Other	________	Other	________	Other	________

56D How many people were you with? EACH TIME

______ People ______ People ______ People ______ People

56E How many were women? EACH TIME

______ Women ______ Women ______ Women ______ Women

56F How many are using drugs currently? EACH TIME

______ Users ______ Users ______ Users ______ Users

56G How many are former users?

______ Ex-users ______ Ex-users ______ Ex-users ______ Ex-users

56H How many were related to you? EACH TIME

______ Relatives ______ Relatives ______ Relatives ______ Relatives

56I How many were close friends? EACH TIME

______ Friends ______ Friends ______ Friends ______ Friends

Item # **Item**

57A How many times did you stop to grab a quick bite or a snack without really stopping to have a full meal on (LAST TYPICAL DAY)?

_______ Times

None ___ (Go to Q. 57C)

57B When during the day did you do this?

From ______ A.M./P.M. From ______ A.M./P.M. From ______ A.M./P.M. From ______ A.M./P.M.

To ______ A.M./P.M. To ______ A.M./P.M. To ______ A.M./P.M. To ______ A.M./P.M.

57C How much time did you spend on (LAST TYPICAL DAY) getting cleaned up and dressed, and doing things like the laundry, ironing, cleaning or shopping?

_______ Hours

None ___ (Go to Q. 58)

57D When during the day did you do these things?

From ______ A.M./P.M. From ______ A.M./P.M. From ______ A.M./P.M. From ______ A.M./P.M.

To ______ A.M./P.M. To ______ A.M./P.M. To ______ A.M./P.M. To ______ A.M./P.M.

58A What about sex? Did you participate in any sexual activities on (LAST TYPICAL DAY)?

a. No ...... 0 ___
b. Yes ..... 1 ___

58B At about what time did you do it?

From ______ A.M./P.M. From ______ A.M./P.M. From ______ A.M./P.M. From ______ A.M./P.M.

To ______ A.M./P.M. To ______ A.M./P.M. To ______ A.M./P.M. To ______ A.M./P.M.

59A Besides the things you have already told me, what did you do in your spare time during the day?

_____________ _____________ _____________ _____________

THEN
What about your free time at night? What did you do?

_____________ _____________ _____________ _____________

59B When exactly did you do these things?

From ______ A.M./P.M. From ______ A.M./P.M. From ______ A.M./P.M. From ______ A.M./P.M.

To ______ A.M./P.M. To ______ A.M./P.M. To ______ A.M./P.M. To ______ A.M./P.M.

Item #	Item
59C	How many people were you with? EACH TIME
	_____ People _____ People _____ People _____ People
59D	How many were women? EACH TIME
	_____ Women _____ Women _____ Women _____ Women
59E	How many are using drugs currently? EACH TIME
	_____ Users _____ Users _____ Users _____ Users
59F	How many are former users? EACH TIME
	_____ Ex-users _____ Ex-users _____ Ex-users _____ Ex-users
59G	How many were related to you? EACH TIME
	_____ Relatives _____ Relatives _____ Relatives _____ Relatives
59H	How many were close friends? EACH TIME
	_____ Friends _____ Friends _____ Friends _____ Friends

STOP

CHECK YOUR TIME LINE TO SEE WHETHER
THE ENTIRE DAY IS ACCOUNTED FOR.
IF YES, GO TO Q. 61. IF NO, ASK:

60A	What were you doing during (TIMES NOT ACCOUNTED FOR)?
	__________ __________ __________ __________
60B	How many people were you with? EACH TIME None ___ (Go to Q. 61)
	_____ People _____ People _____ People _____ People
60C	How many women were there? EACH TIME
	_____ Women _____ Women _____ Women _____ Women
60D	How many are using drugs currently? EACH TIME
	_____ Users _____ Users _____ Users _____ Users
60E	How many are former users?
	_____ Ex-users _____ Ex-users _____ Ex-users _____ Ex-users
60F	How many were related to you? EACH TIME
	_____ Relatives _____ Relatives _____ Relatives _____ Relatives
60G	How many were close friends? EACH TIME
	_____ Friends _____ Friends _____ Friends _____ Friends

Item # **Item**

IF NO MENTION OF HAVING SPENT TIME WITH FRIENDS OR RELATIVES, ASK Q. 61. OTHERWISE GO TO Q. 62.

61A Did you spend any time (LAST TYPICAL DAY) with friends or members of your family?

a. No . . . . . . 0 ___ (Go to Q. 62)

b. Yes . . . . . 1 ___

61B What did you do with friends? EACH TIME

_______________ _______________ _______________ _______________

61C And what did you do with relatives? EACH TIME

_______________ _______________ _______________ _______________

61D About how long did you do that? EACH TIME

______ Mins. Hrs.	______ Mins. Hrs.	______ Mins. Hrs.	______ Mins. Hrs.

62A Do you do a lot of things with the same people or do you usually do things with different people?

a. With same people . . . . 1 ___

b. With different people . . . . . . 2 ___

62B (Do/did) you do other things with the same people you (do/did) your drugs with?

a. No . . . . . . 0 ___

b. Yes . . . . . 1 ___

62C Is there any one person, or maybe a couple of people, that you do more things with than anyone else?

a. No . . . . . . 0 ___ (Go to Q. 63)

b. Yes . . . . . 1 ___ Who? ______________________________

62D (Does this person/which of these people) use drugs now? ______________________________

INDIVIDUALIZED PREDICTION AS A STRATEGY FOR DISCOVERING DEMOGRAPHIC AND INTERPERSONAL/PSYCHOSOCIAL CORRELATES OF DRUG RESISTANCE AND ABUSE

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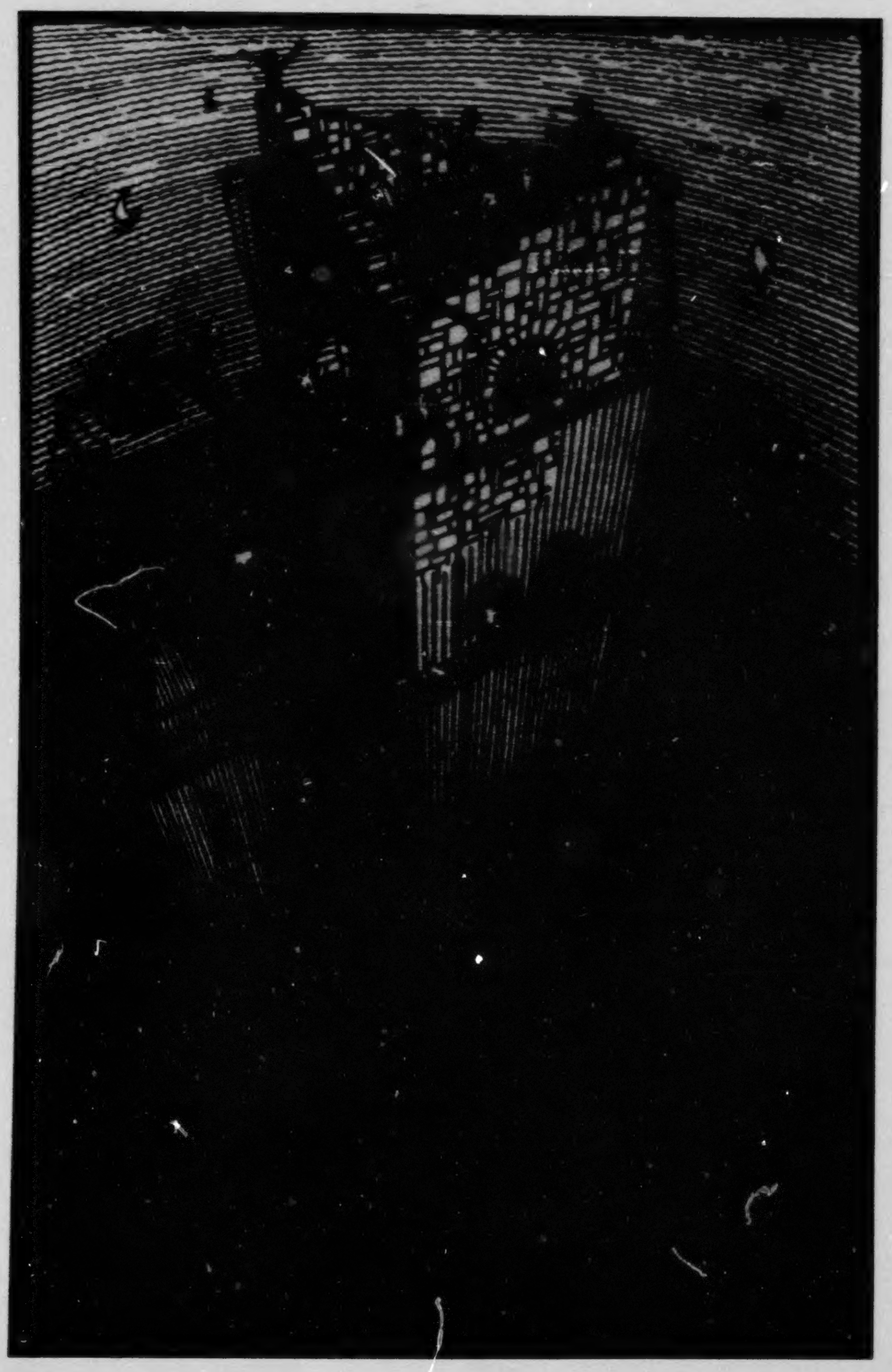

Plate 10

INDIVIDUALIZED PREDICTION AS A STRATEGY FOR DISCOVERING DEMOGRAPHIC AND INTERPERSONAL/PSYCHOSOCIAL CORRELATES OF DRUG RESISTANCE AND ABUSE

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PROBLEMS WITH CLASSIC PSYCHOMETRICS IN PREDICTING DRUG USE PATTERNS

Personnel judgments and predictions of patterns of human behavior usually occur in the form of nominal or categorical descriptions. Such evaluations are in marked contrast to the precise quantitative designations made in the physical sciences. Predictions of such personal outcomes as getting through college successfully, choosing a career, achieving success in one's occupation or marriage, smoking or not smoking, drinking or not drinking are common in psychology and most other behavioral sciences. The practical usefulness of making accurate typological or "pigeon-hole" designations for persons is particularly apparent in efforts to describe and predict different behavioral patterns of drug resistance or drug abuse.

The drug use literature is filled with category-type descriptions involving types and amounts of drugs used, frequency of usage, and even distinctions involving reasons for nonuse (such as "principled" nonusers vs. "non-principled" nonusers).

Classic Psychometric Theory

Recognizing that designations involving drug use/abuse are mostly nominal or categorical has important implications for predicting such behavior. The implications stem primarily from the sharp contrast between category predictions and the kinds of predictions on which most classic psychometric theory is based. Much of the classic psychometric theory was developed early in this century by Charles Spearman, who sought to adapt the measurement concepts of the physical sciences to the measurement of human characteristics. The physical sciences deal with quantification of continuous measures such as length, mass, and temperature; emphasis is given to precise measurement and to the accuracy of point (rather than category) estimates. Spearman naturally came to be greatly concerned with errors of measurement, and he elaborated theory and methods for estimating the magnitude of such errors. His approach to the study of errors of measurement had two major effects on behavioral science thinking which only recently have been called into question.

First, emphasis came to be placed exclusively on the "instruments" of measurement rather than on the persons being measured. Measurement errors were assumed to be randomly distributed across all persons, and the possibility of interactive effects between persons and instruments was not recognized. Psychometric theory assumed that errors of measurement differed only from instrument to instrument but that all persons assessed with any given instrument were evaluated with essentially the same degree of precision.

Second, errors were treated as essentially equivalent, no matter where they occurred along the continuous scales of criterion behaviors. Since psychometric theory did not cope directly with category predictions, no distinction was made in the theory for the different costs and differential effects of different types of prediction errors such as the contrasting costs of false positive and false negative errors in medical diagnosis. Two errors of the same magnitude were viewed as equivalent even though one error might simply transpose two persons within the same behavior category while the other might erroneously transpose persons between different behavior categories. In developing methods for evaluating personal and social parameters likely to result in drug resistance, drug use, and drug abuse, the relative costs--both individually and societally--of making different types of prediction errors must be considered carefully. Yet, classic psychometric prediction theory does not direct us to do so.

Needs in Predicting Patterns of Drug Use/Nonuse

It can be argued that prediction systems related to drug use and drug resistance or abuse must depart substantially from the directions ordinarily taken by classic psychometric theory. Prediction systems will, in all likelihood, need to be quite specific to particular subgroups. For example, marihuana use/abuse seem clearly to involve different persons and different prediction parameters from the use/abuse of hard narcotics. No single set of predictors can be expected to be optimal for all young people across all types of drug use/abuse and the frequency and intensity of such use. This means that research in this area must seek to develop several prediction systems determined empirically to be optimal for various subsets of individuals, behavior patterns, personal backgrounds, and types of drug use/abuse. Statistical prediction methods combining multiple discriminant function methods with such techniques as subgrouping, moderator, and configural, actuarial pattern analysis are being used more and more frequently and successfully to solve exactly the kind of problem posed by the need for multiple sequential prediction strategies in specifying the nature of youthful decisions related to drug usage.

Shortcomings of Classic Psychometric Theory

Over a decade ago, Ghiselli (1960b, 1963) reviewed evidence showing that the central assumption of classic psychometric theory--that errors of measurement were distributed randomly over persons--is not empirically justified in many prediction situations. He showed essentially that the magnitudes of errors of measurement frequently differ in a stable and statistically significant way from person to person. That is, some individuals' scores on tests and inventories are simply more accurate than scores obtained on those same tests and inventories by other persons; the net result is that behaviors associated with those scores may be predicted with greater certainty for the more accurately measured persons than for the less accurately measured persons. About the same time, Berdie (1961) obtained the same result with substantially different methodology. Recently, Bem and Allen (1974), operating from a social psychological persuasion instead of a psychometric one, have shown that persons can be identified and subgrouped according to differences in their predictability (or consistency of behavior). In fact, Bem and Allen confirmed in one of their studies an elegantly simple hypothesis: "Individuals who identify themselves as consistent on a particular trait dimension will in fact be more consistent cross-situationally than those who identify themselves as highly variable." (Bem & Allen, 1974, p. 512).

In addition to the above investigators, who have argued convincingly that errors of measurement and of prediction are not distributed randomly across persons, others (Cronbach & Gleser, 1957; Lykken, 1956; Lykken & Rose, 1963; Meehl, 1950; Dunnette, 1963, 1966) have called attention to other assumptions of the usual linear regression model which frequently are not realized in practice. For example, assumptions of linearity and homoscedasticity are often not satisfied in predictor-criterion distributions; bivariate distributions are frequently curvilinear and often heteroscedastic, especially in situations involving the prediction of category designations or behavioral typologies as opposed to the continuous variables (with interval and ratio scale properties) enjoyed by the physical sciences.

A MORE COMPLICATED PREDICTION MODEL

In order to do justice to the complexities of real prediction situations and to assure investigators' attention to the need for homogeneous subgrouping of persons according to demographic/interpersonal typologies, situations, behavior patterns or categories, and levels of predictability, Dunnette (1966) presented a new prediction model to take the place of models based solely on classic psychometric theory. The model, modified to be applicable to the prediction of varying behavioral patterns related to drug resistance and use/abuse, is shown in Figure 1. The brackets and arrows serve as reminders of the many possibilities for different prediction strategies that should be considered in any prediction study. The brackets in the diagram signify different groupings of "tests" for different groups of persons, depending upon the patterns of behavior to be predicted. The arrows in the diagram show that different avenues based on various groupings of predictors, persons, and behaviors may be utilized. For example, predictors P_2 and P_3 might be tried for individuals I_2 and I_3 or for individuals I_1 and I_2, but they probably would yield different predictions of behavior tendencies. The diagram also protrays the possibility of different predicted tendencies leading to various actual behavior patterns depending upon differing situational contexts. Thus, the prediction model calls attention to the likelihood of complex interactions between predictor groupings, groups or types of individuals, behavior tendencies, and actual behavioral outcomes. The model makes explicit the necessity for predicting actual behavior and studying it in the context of different situations rather than simply contrasting groups formed on the basis of overall drug use/nonuse patterns. The importance of taking into account differing contextual or situational factors was shown very clearly in a recent investigation by Strimbu (1973) Even though he proceeded according to the subgrouping methods inherent in the model of Figure 1 (by forming groups of individuals on the basis of similar bio-data responses), he found that persons showing the same patterns of drug use/nonuse frequently scored very differently on factors scored according to bio-data groupings. Strimbu's research was not designed specifically to discover the reasons for such contradictory results, but situational/contextual factors are implied in his comment that 'it is suspected that the distribution of unexplained drug use variance is not uniformly dispersed among 28 University System campuses and that this will selectively attenuate or increase the resultant subgroup/drug use relationship.' (Strimbu, 1973, p. 82).

Moderator Analysis and Actuarial Pattern Analysis

Returning to the model dipicted in Figure 1, we should note that research based on this model becomes a series of investigations designed to discover the optimal groupings or subsets of predictors, persons, behaviors, and situations within which to study patterns of predictability for validating and cross-validating prediction strategies. The model implies no lessening of interest in predicting behavioral outcomes, but it does direct research efforts toward a more careful analysis of their behavioral and situational antecedents with the hope of understanding these behavioral outcomes better and of predicting them more accurately. In essence, the model incorporates the concept of differential predictability. Differential predictability acknowledges that a given set of variables may be more valid for some persons than for others. This modified model of prediction proposes a research strategy designed to develop specific sets of predictors that are optimal for use with specific subgroups of persons. In effect, such individualized prediction strategies are invaluable not only for developing empirically based prediction equations but also for developing behavioral theories which add explanatory power to the prediction systems. Two major search strategies are available. They include (1) subgrouping or moderator analyses and (2) configural or actuarial techniques. These two methods are described below.

A moderator variable is the general term referring to any variable, quantitative or qualitative, which may be used to identify differentially predictable subgroups of individuals (Banas, 1964). Moderator variables are used in Dunnette's prediction model to identify particular predictors which maximize the accuracy of predictions for specific subgroups. Using this method a moderator variable is idenfitied which will isolate from

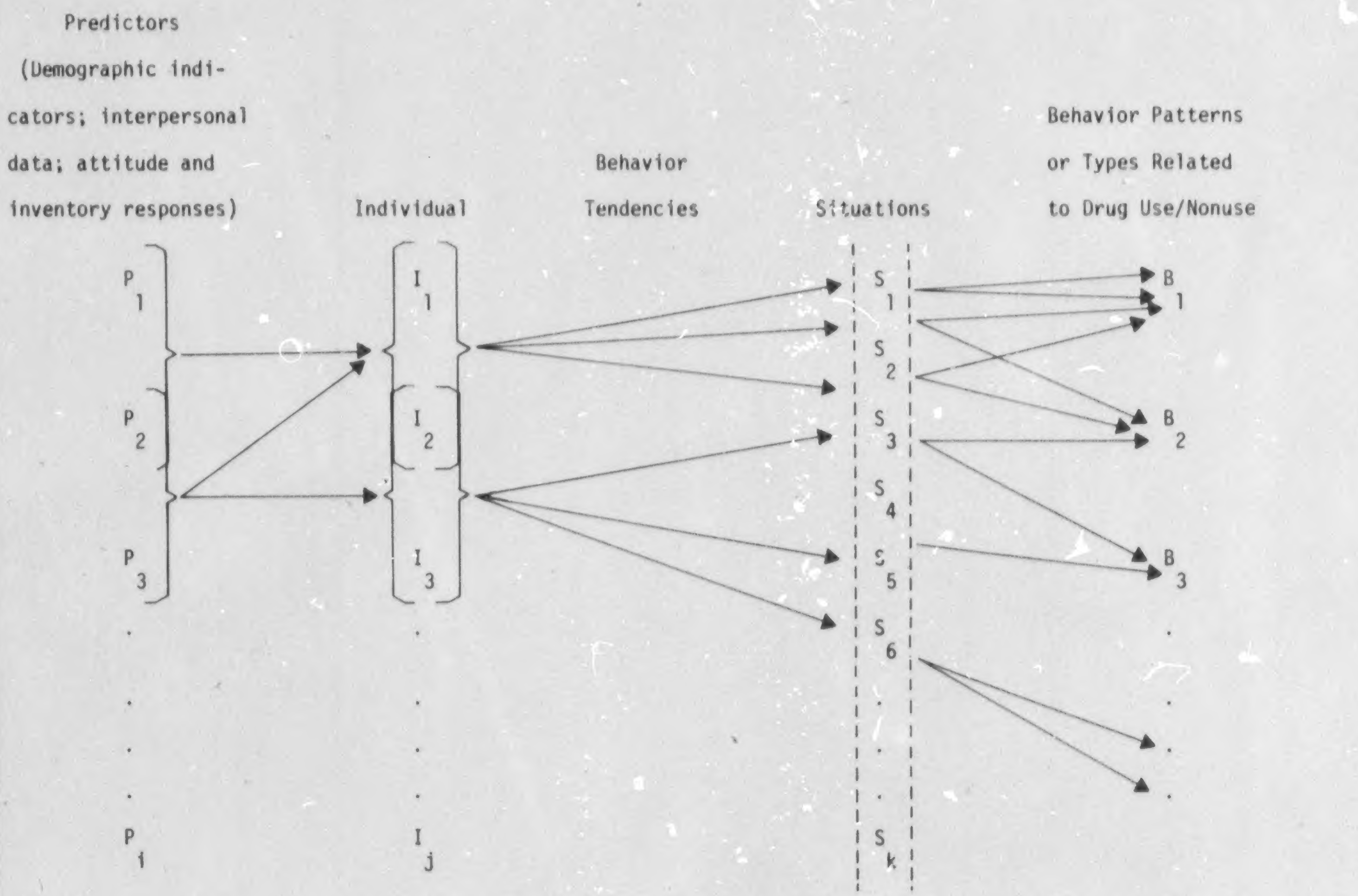

Predictors
(Demographic indicators; interpersonal data; attitude and inventory responses)
Individual
Behavior Tendencies
Situations
Behavior Patterns or Types Related to Drug Use/Nonuse
P_1
P_2
P_3
P_i
I_1
I_2
I_3
I_j
S_1
S_2
S_3
S_4
S_5
S_6
S_k
B_1
B_2
B_3

Figure 1. A Model for Guiding the Investigation of Prediction Strategies Related to Drug Resistance and Use/Abuse

the population of individuals a relatively homogeneous subgroup of individuals who are most predictable (i.e., have the smallest standard error of measurement) using an initial set of predictors. Then another weighting or set of predictors is selected, and again a moderator variable is identified which will isolate from among this previously "unpredictable group" a subgroup which is most predictable and so on until a set of predictors or predictor weightings has been assigned to all the individuals in the subject population.

Ghiselli (1956, 1960a, 1960b, and 1963) developed moderator variables through item analysis methods by selecting those items which were highly correlated with the absolute difference between individuals' standardized predictor and criterion scores. In one study, Ghiselli showed that a moderator variable could be developed which increased the predictive accuracy from a level of only r=.22 to a level of r=.66 for the more predictable subgroup (comprising a third of the total group).

Configural scoring, or the use of scoring methods which utilize configural or pattern relationships among tests (or items), is another approach to subgrouping. The rationale for studying pattern relationships is reported by Lee (1958, p. 397): "The predictive significance of the score on a given independent variable is relative to the scores received on other variables, or, in mathematical terminology, that certain criteria can better be described as joint, nonadditive rather than linear, additive functions of their predictors." Prediction strategies using a configural approach attempt to capitalize on the interrelationships among predictors. Usual scoring procedures using linear combinations ignore information present in the response configuration; items in a predictor scale are scored instead "1" or "0." A score of nine on a ten-item test can be obtained by answering any of ten different combinations of nine items correctly $\left[\frac{(10!)}{(9!)\,(1!)}\right]$.

A configural analysis would study each of the ten configurations which yield the same score, considering each to be of potentially differential importance. The essential difference between configural scoring and linear combinations is that interactions among variables are considered in the former. Meehl (1950) dramatized the importance of interaction effects among predictors with a two-item paradox. Each of the items considered separately had zero relationship to the criterion; yet considered jointly in a configural manner, the items predicted the criterion perfectly.

Lykken and Rose (1963) used configural scoring to differentiate between neuroticism and psychoticism. Starting with 11 scales from the MMPI, the highest crossvalidities were obtained using only two scales scored configurally. The profiles were scored configurally by dividing each predictor into three intervals with approximately equal Ns. Looking at this procedure graphically, the bivariate distribution is divided into three intervals on each axis, resulting in a nine-cell scatterplot. The composition of the cells revealed locations on the scatterplot where considerable differences occurred in the relative ratios of numbers of neurotics and psychotics. The composition of the cells indicated that differential concurrent predictions across subcells would result in higher accuracy than prediction across the entire scatterplot. The predicted score for each subject was scored as the mean of the cell into which he fell on the scatterplot. The variance of the cell indicated the residual error for that cell. Using this technique the authors were able to predict neurotic-psychotic better than a discriminant function based on the same data.

Moderator and configural scoring approaches share a common limitation. Unless the size of the developmental sample is large, statistical relationships discovered by the methods are likely to be quite unstable. Instability arising from the use of a small development sample will result in a significant shrinkage in the accuracy of prediction when the derived scoring is applied to cross-validation samples. Sorenson (1964) studied the possibility of reducting the degree of statistical shrinkage in configural prediction by selecting highly reliable predictor items (biographical information such as marital status, age, educational level) and using large samples. Over 1,000 salesmen hired over a two-year period served as his developmental sample. A cross validation sample of 600 subjects was available from salesmen hired during the following year. Sorenson concluded that configural prediction based on reliable predictor items yields higher predictive efficiency than nonconfigural prediction. Moreover, the amount of statistical shrinkage upon cross validation was no greater than that associated with linear prediction systems, using multiple regression strategies or simple nonconfigural scoring methods.

COMBINATORIAL METHODS OF PREDICTION: TOWARD SEQUENTIAL DECISION STRATEGIES

A review of existing knowledge of youthful drug use/abuse and a survey of statistical prediction strategies and their accuracy lead to a conclusion that many prediction scales should be developed and combined with other information via several statistical approaches to maximize the potential accuracy of prediction of drug use/nonuse patterns. Such prediction should utilize not only multiple regression and discriminant function analyses but also the moderator and configural approaches described above. In this regard, we have successfully adapted the computer search technique developed by Sonquist and Morgan (1964). Essentially, the program [called the Automatic Interaction Detector (AID)] scores predictors configurally by using a variance procedure as a criterion for maximizing predictive efficiency at each step of the predictor selection sequence. The program iteratively selects predictors and predictor binary splits to maximize between-group variance and minimize within-group criterion variance.

An Example of Individualized Predictions: Predicting Adolescent Smoking

Johnson (1970) used this program successfully in combination with multiple discriminant function equations to select optimal configural decision rules to predict adolescent smoking behavior.

Since Johnson's research used methodology similar to that which might be used successfully for predicting various drug use patterns, a brief review of his method and results may be instructive.

First, a series of discussions was held with adolescents to learn as much as possible about their current attitudes, opinions, worries, anxieties, hopes, and goals.

Information gleaned from these discussions, along with an extensive search of the literature, formed the basis for formulating a series of simply worded questionnaire items. Over 600 items were developed and pretested in the school system of a small town in southern Minnesota. The pretest information was examined for redundancy, acceptability, and simplicity.

Questions surviving the pretest analyses were combined into a 226-item questionnaire. (See Appendix A for a listing of items comprising these scales.) The broad dimensions measured by the various questions along with sample items from each are shown below:

- Attitude toward Authority. "I get a lot of kicks out of doing things I know are wrong."
- Peer Group Relations. "I do pretty much what the kids around me do."
- Attitude toward Parents. "My parents are too old-fashioned."
- Impulsiveness. "I would do almost anything on a dare."
- Health and Smoking. "Smoking is harmful."

- General Attitudes about Smoking. "There are a lot of good things about smoking."
- Appearance. "I like it when other kids notice how nice I look."
- Sexual Attractiveness. "Guys who smoke have more fun with girls."
- Concern for the Future "The future is too far off to worry about it."
- Extroversion. "I like to go out with attractive persons of the opposite sex."

The questionnaire was administered to 11,757 seventh, eighth, and ninth grade students in Chicago suburban and Minneapolis schools. The administration was handled with extreme care and replies were anonymous. Pilot studies showed that self-reports of smoking behavior were highly accurate portrayals of actual behavior.

Questionnaire responses comprising just those statements that made no reference to smoking were factor analyzed.

The factor analyses for all items yielded the following ten scales:

I. General Attitudes Toward Smoking
II. Peer Conformity, Social Anxiety, Impulsiveness
III. Smoking and Sexual and Social Attractiveness
IV. Live for the Present; Fatalistic Lack of Concern for the Future
V. Risk-Taking Rebelliousness
VI. Exhibition and Social Activism
VII. Generation Gap
VIII. Smoking is Harmful
IX. Smoking is Dirty
X. Morality and Social Conformity

(See Appendix B for a listing of items according to the above scale dimensions.)

The factors were correlated with the dichotomy smoking versus nonsmoking. Multiple stepwise discriminant function analysis was used to develop equations maximally predictive of smoking behavior. The overall multiple coefficient proved to be .53. The scales yielding significant contributions and their individual relationships to the criterion are shown below:

Scale	Correlation
Peer conformity	.41
Living only for the present	.35
Risk-taking rebelliousness	.44
Exhibition	.35
Generation gap	.35

The multiple discriminant function equation was then used in combination with other demographic variables and questionnaire responses in the Sonquist and Morgan Automatic Interaction Detector program. The outcome of this combinatorial analysis (using both the discriminant functions and the AID configural search program) is shown in Figure 2.

Note that Figure 2 shows the optimal strategy for maximizing the accuracy of prediction of smoking behavior for various differentially predicted subgroups in the group of 969 students chosen for this illustration. The various stages in the prediction are:

Stage 1. The discriminant function is applied to yield the subgroups shown in boxes 2a and 2b.

Stage 2. The discriminant function is applied again to yield boxes 3a, 3b, 3c, and 3d. The 130 persons in 3a are predicted with high accuracy (90%) to be smokers. The 184 persons in 3d are predicted with high accuracy (92%) to be nonsmokers.

Stage 3. Responses to whether the father does or does not smoke results in increased accuracy for predicting smoking or nonsmoking for the persons in box 3b, as shown in boxes 4a and 4b. Similarly, responses to a social activity question identify a small group of 34 students (in box 4c), the majority of whom are smokers.

Stages 4 and 5. Responses to whether the mother does or does not smoke and the information about age and scholastic achievement are helpful in further subgrouping the remaining 369 students into 74 (box 6a), 72% of whom are smokers; 114 (box 6b), 71% of whom are nonsmokers; 101 (box 6c), 67% of whom are nonsmokers; and, 80 (box 6d), where an overwhelming 95% are nonsmokers.

The results protrayed in Figure 2 are, of course, not directly applicable substantively to the prediction of patterns of drug use/nonuse for other drugs. However, Johnson's methodology and the sequential decision strategy portrayed in Figure 2 are directly illustrative of the multi-faceted prediction systems that can be developed. Note that Johnson did successfully develop separate empirical prediction scales for smoking/nonsmoking behavior among various subgroups of young persons. Similarly, it should be possible to discover and utilize empirical and theoretical knowledge about the demographic, personal/interpersonal, and contextual correlates of drug use/abuse among young persons and to use this knowledge to devise the number and types of prediction scales necessary and sufficient for predicting various patterns of drug resistance and use/abuse among various subgroups of young persons.

Stability of Decision Rules Based on Nonlinear Prediction Models

One of the major problems facing attempts to develop differential prediction systems within population subgroups is the statistical stability of prediction equations. Frequently, item weights, regression coefficients, and other decision rules which yield promising results in development samples do not "hold up" when applied to cross-validation samples. Conceptually powerful methodologies such as interaction analyses and configural or sequential scoring are particularly prone to such shrinkage in predictive accuracy upon cross validation. Indeed, this issue of the statistical stability is at the center of the dictum stated by Bentler and Eichberg (1975): "Linear regression models are almost always superior to nonlinear models."

The relatively infrequent demonstration of predictive superiority for decisions based on nonlinear models is due to a number of factors which can be overcome in future research investigations. In fact, it is imperative that these factors be taken into account and corrected if the nonlinear or "individualized" model's promise of great gains in the understanding (as well as prediction) of drug-related behavior patterns are to be realized. What are some of these factors, and how may they be overcome?

First, many of the comparisons made between linear and nonlinear models have suffered from a variety of inappropriate applications of nonlinear models. One of the most frequent misapplications has involved a misunderstanding of the basic approach used by Ghiselli in his moderator variable search strategy. Persons contemplating research with nonlinear models, particularly those involving a search for moderator variables, should give careful attention to the methodological critique written by Abrahams and Alf (1972) and the suggestions for new approaches made by Dunnette (1972).

Second, sample sizes in most studies have not been sufficiently large to take account of the requirements for increased statistical stability of the more complicated decision systems stemming from applications of nonlinear models. When sample sizes are limited to fewer than several hundred, the more robust models of ordinary linear regression will almost always show less shrinkage of cross validation than that shown by nonlinear models. The potential power of nonlinear models simply cannot typically be realized with samples of the sizes usually encountered in behavioral science studies. It should be noted, however, that Monte Carlo routines can be extremely useful for providing empirical estimates of the likely shrinkage to be expected in cross-validation samples. If such computer routines are available, relative shrinkages can be estimated directly, and one may then wish to evaluate nonlinear models even when samples are not gigantic. The best avenue, however, still is to utilize very large samples in order to increase one's confidence in the stability of nonlinear prediction and decision rules.

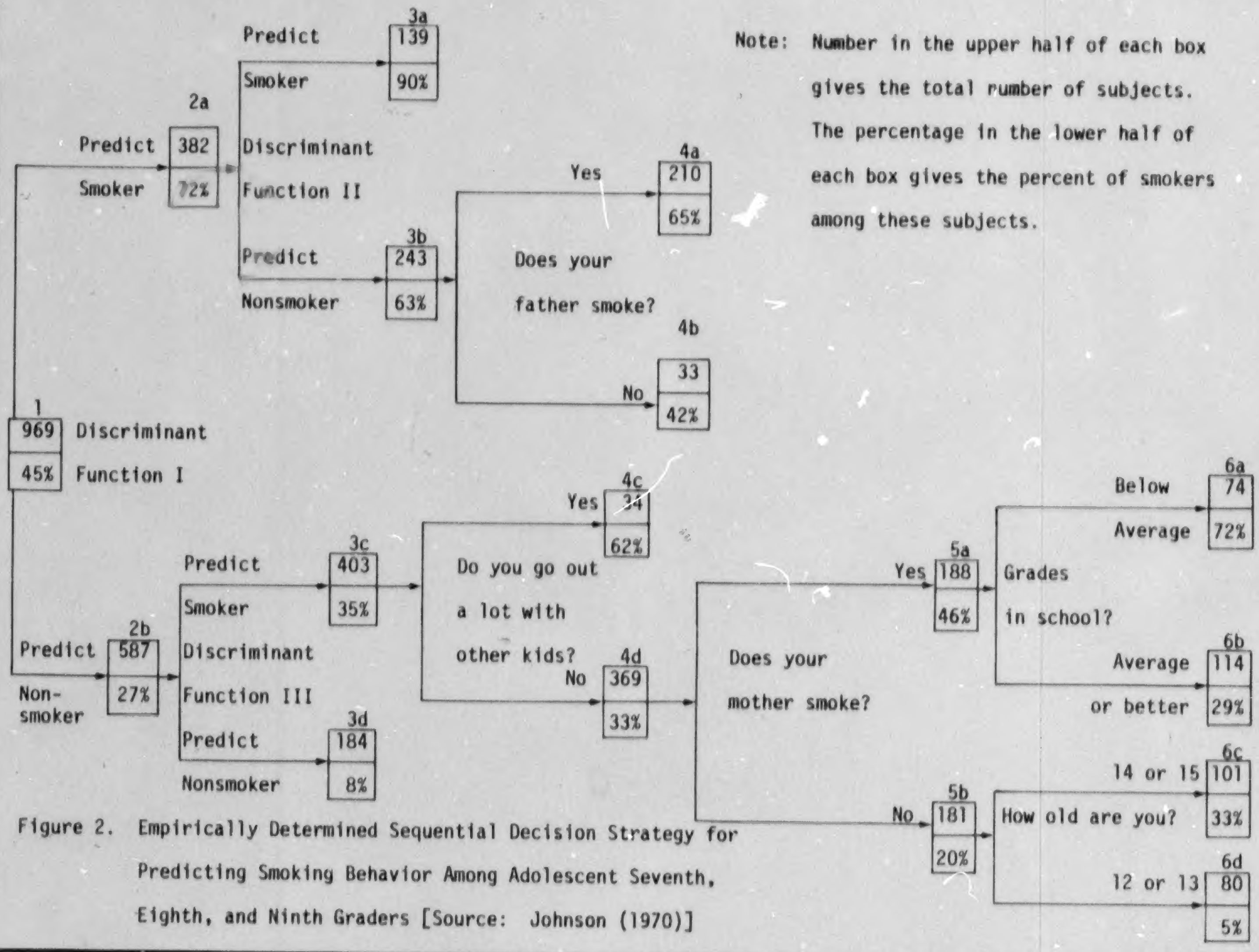
Third, many investigators have unfortunately seemed to imply that the nonlinear models might somehow overcome inadequacies of questionnaire construction and other facets of poor instrumentation. As a result, no greater care and, perhaps, sometimes less has been given to conceptualizing and developing measures of independent and dependent variables than when linear models are used. In fact, of course, the need for good psychometrics in criterion behavior measurement and in test and inventory development is even greater when nonlinear models are investigated. Using the more complicated prediction model portrayed in Figure 1 in no way can be regarded as reducing the need for good measurement of the basic variables to be investigated in the model.

Finally, investigators typically have not pursued nonlinear models far enough. Too frequently, search routines have been terminated at the point where differentially predictable subgroups have been discovered. Such a discovery is helpful, of course, as a first step in understanding more fully the dimensionality of the criterion behavior being studied; but it should not be seen as a stopping point, and it should not be regarded as the point where comparisons between linear and nonlinear models must be made. A full commitment to the model shown in Figure 1 implies that the search for prediction systems will go far beyond the point of identifying more and less well-predicted persons. It implies also the development of accurate prediction systems for those who initially turn up within the poorly predicted subgroups. This, in turn, requires a long-term programmatic research effort which will continue to investigate all the complexities of behavior prediction implied by the individualized model.

All of the above matters need special emphasis, then, when one sets out to taste the fruits of better understanding and better prediction by using nonlinear models. In sum, these areas of emphasis include (1) careful attention to appropriate nonlinear search methodologies, (2) use of very large samples or Monte Carlo routines to estimate empirically the shrinkages that might occur in cross validation, (3) increased (instead of reduced) attention to good psychometrics in criterion measurement and in test and questionnaire development, and (4) a research commitment to continue the search for nonlinear systems beyond the point of merely establishing differential patterns of prediction.

OTHER CONSIDERATIONS: SUBSTANTIVE AND METHODOLOGICAL

The previous discussion has focused exclusively on psychometric considerations and has described the nature of the prediction problem faced by behavioral scientists


1
969
45%
Discriminant
Function I
Predict
Smoker
2a
382
72%
Predict
Non-
smoker
2b
587
27%
Predict
Smoker
3a
139
90%
Discriminant
Function II
Predict
Nonsmoker
3b
243
63%
Does your
father smoke?
Yes
4a
210
65%
No
4b
33
42%
Predict
Smoker
3c
403
35%
Discriminant
Function III
Predict
Nonsmoker
3d
184
8%
Do you go out
a lot with
other kids?
Yes
4c
34
62%
No
4d
369
33%
Does your
mother smoke?
Yes
5a
188
46%
No
5b
181
20%
Grades
in school?
Below
Average
6a
74
72%
Average
or better
6b
114
29%
How old are you?
14 or 15
6c
101
33%
12 or 13
6d
80
5%

Note: Number in the upper half of each box gives the total rumber of subjects. The percentage in the lower half of each box gives the percent of smokers among these subjects.

Figure 2. Empirically Determined Sequential Decision Strategy for Predicting Smoking Behavior Among Adolescent Seventh, Eighth, and Ninth Graders [Source: Johnson (1970)]

as it relates to issues involved in predicting particular patterns or categories of drug use/abuse or nonuse (resistance). An effort has been made to show how classic psychometric models and theory may be over-simplified for handling these prediction problems. A new, more complicated model, the so-called Dunnette model, has been presented and discussed in the context of newer psychometric methodologies: moderator analysis and actuarial pattern analysis. Finally, an example of one fairly large-scale study designed to discover concurrent attitudinal and bio-data correlates of smoking behavior among adolescents has been described briefly in order to illustrate how an individualized prediction strategy may be developed according to the major features suggested by the Dunnette prediction model.

Somewhat less esoteric aspects of the prediction of adolescent drug resistance or drug use/abuse also need to be considered. First, what does existing literature tell about the personal and biographical/demographic correlates or predictors of drug-related behavior among present-day youth? That is, what are the substantive aspects to be incorporated into surveys, questionnaires, and inventories to be used in efforts to discover predictor variables? What, basically, should we seek to find out from youth?

Second, given knowledge about the substantive elements of potential importance, how should surveys be undertaken? How should items be written; how should questionnaires, inventories, and scales be developed; and what methods of data gathering may be best for obtaining accurate results?

Substantive Considerations

Information already available about patterns of drug use/abuse among youth shows clearly that type and level of drug usage is moderated by factors such as socioeconomic status, age, sex, and ethnicity. Because of this, it is necessary to develop "selective predictors" to be used for identifying potential for drug use/abuse within specified subgroups. Much available research has been summarized by Braucht, Brakarsh, Follingstad, and Berry (1973) and Sadava (1970). A brief summary of their reviews is given here followed by descriptions of some of the larger scale studies which have appeared since the Braucht et al. review.

Various demographic factors have been shown to relate to frequency of drinking and amount of alcohol consumed. Many studies have indicated that the young drinker frequently has parents who drink. For example, Gusfield (1970) determined that heavy drinkers among college students were more likely to have parents who were heavy drinkers than were college students who used alcohol only slightly. MacKay (1961) found that young problem drinkers were more likely to have parents who were alcoholics. Membership in a college fraternity also seems to be related to alcohol use as Gusfield (1970) and Rogers (1970) report. More fraternity members respond that they use alcohol than nonfraternity members. Religious persuasion has been shown to relate to alcohol use with the average drinker more likely to be a member of the Jewish or the Catholic faith (Maddox, 1970). However, as the review by Braucht et al. (1973) points out, the problem drinker is more likely to be a Protestant or a Mormon.

Personality characteristics associated with alcohol use among young people have been studied. Williams (1966, 1970) determined that problem drinkers among college students are more likely to be anxious, depressed, impulsive, and aggressive. Similarly, Jones (1968, 1971) determined that heavy drinkers are more impulsive, unpredictable, and unstable than nondrinkers or moderate drinkers. Jessor, Young, Young, and Tesi (1970), in a cross-cultural study, determined that for American youth there is a relationship between the personality attributes reflecting frustration, dissatisfaction, and powerlessness and the alcohol intake and frequency of drunkenness. No such relationship was found for Italian youth.

Available evidence relates marihuana use among young people to socioeconomic status (Braucht et al., 1973). The use of marihuana has been most prevalent among the children of middle and upper-middle class parents. In addition, Green, Blake, Carboy, and Zenhausern (1971) determined that middle class high school marihauna users differed from nonusers on several traits. Users tended to be more vulnerable to frustration, more headstrong, reckless, group dependent, and less self-controlled. However, these traits seemed unrelated to the subject's academic capacity group (curriculum). Hogan, Mankin, Conway, and Fox (1970) found that college marihuana users differed from nonusers on the California Psychological Inventory. Users were found to be more open, socially aware, and had wider interests than nonusers; however, they were also more impulsive, irresponsible, pleasure seeking, and rebellious than were the nonusers.

The youthful user of so-called "hard" narcotics is characterized by Braucht et al. (1973) as often being a member of an ethnic minority and coming from a broken home, most likely in an urban environment. Furthermore, they are immature, insecure, irresponsible, and egocentric. However, there appears to be little consensus about how the characteristics fit together. There is general agreement that narcotic addicts suffer from a personality disorder, but there is little agreement on the theoretical makeup of the typical addict.

It is difficult to draw conclusions relating the characteristics of users to the type of drug used. Part of this difficulty stems from the failure of the researchers to undertake a coordinated program of research. This has resulted in most of the research on alcohol use centering on the problem drinker--the alcohol-dependent user. Similarly, the research on narcotics has revolved around the addict. However, in general, reserach on marihuana, hallucinogenic drugs, and psychedelic drugs, has concentrated primarily on the casual user as distinguished from the physically or psychologically dependent user. Hence, it becomes difficult to draw parallels between the characteristics of users of different types of drugs.

One of the best recent studies, involving both concurrent correlates of marihuana use and longitudinal prediction, was conducted by Jessor, Jessor, and Finney (1973). A 50-page, self-report questionnaire requiring about 1 1/2 to 2 hours for completion was administered (with parental consent) to 949 high school students in three junior and three senior high schools and to 276 University of Colorado freshmen. In order to measure change and to obtain predictive information, the investigators re-administered the questionnaire to 692 and 605 of the high school students after one and two years, respectively, and to 248 of the college students at the end of a year. The investigators tested four hypotheses, namely: (1) marihuana use should co-vary with other "problem" behavior; (2) marihuana use is related to measurable personality and perceived environmental variables; (3) decisions to begin using marihuana is predictable from differences in personality and social variables obtained at the time of initial measurement; and (4) individuals who begin to use marihuana during the interval of time encompassed by the study will show greater changes in personality and social variables than persons who remain nonusers.

Results provide considerable support for the first two hypotheses for both high school and college youth and for both males and females. Basically, users value achievement less and independence more, tend toward greater alienation and social criticism, are more tolerant of deviance, are less religious, see less compatibility between peers and parents, are more subject to pressures involving peer acceptance, indulge more infrequently in "conventional" activities (church, school clubs, etc.) and more frequently in "deviant" behaviors (use of alcohol, sexual intercourse, etc.) than nonusers. The third hypothesis was confirmed for both high school males and females but not for college students. Among high school students tendencies to begin marihuana use were most clearly related to variables such as attitudes toward deviance, religiosity, peer influence, intercourse/petting experience, and church attendance. Somewhat different patterns were obtained for males and females, though both discriminant functions were highly significant statistically and practically. The fourth hypothesis was supported weakly and ambiguously.

A large scale concurrent validation study was carried out by Strimbu (1973). The "University System Drug Attitude Survey," consisting of biographical, attitudinal and self-report drug use information, was completed by 24,000 University of Georgia students (from throughout the University's 28-member institutions). In order to work with a sample of manageable size, data were finally analyzed for 1840 males. The analysis compared proportions of reported drug use between 17 relatively homogeneous subgroups formed on the basis of biographical information. Drug use was studied separately for tobacco, alcohol, marihuana, LSD, glue sniffing, amphetamine-stimulants, narcotics, other hallucinogens, and depressants. Multiple regression analyses of the usefulness of subgroup membership or genearlized factor scores for "predicting" different types of drug use yielded weak to moderate relationships as shown below.

Drug	Multiple Correlation Coefficient*
Tobacco	.22
Alcohol	.26
Marihuana	.30
LSD	.28
Glue	.21
Narcotics	.27
Stimulants	.29
Hallucinogens	.28
Depressants	.24

*The above values were not cross validated.

As already mentioned, sharply differing factor scores based on bio-data were frequently obtained for similar levels and types of drug use/nonuse, a fact explained by the investigator as possibly reflecting important situational or contextual differences between the many different campus settings from which respondents were selected.

A predictive study was conducted among 2,222 high school students (grades 7 to 12) by Smith, Fogg, Greenwald, and LaBrie (1973). A questionnaire involving attitudinal, personality, biographical, and self-report behavioral information was administered in 1969. Of the 2,222 students, 94% chose to participate, and 88% willingly identified themselves, thereby making possible a follow-up questionnaire concerning drug usage two years later. At the time of follow-up, respondents were divided into five groups:

- No drug use
- Marihuana only infrequently (1-10 times)
- Marihuana frequently (11+ times)
- Marihuana and other drugs (heroin, hallucinogens, stimulants, depressants)
- Those who had reported the use of drugs in the earlier survey.

All comparisons on five measures between the No Use group and all other groups were statistically significant. The five significant variables included: rebelliousness against rules and authority, peer ratings of obedience, grades in school, cigarette smoking, and attitudes toward cigarette smoking.

Horowitz and Sedlaack carried out a large scale predictive study based on personal interviews with 1,064 freshmen and 1,077 upperclassmen at the University of Maryland. Unfortunately, their predictors were made up mostly of opinion statements involving various beliefs about practices in relation to drug use (such as "University officials should not turn in students selling drugs" and "I would not report a student for selling marihuana"). Thus, even though fairly substantial validity coefficients were obtained via multiple regression analyses (R=.47), the results lack subtlety. They do not depart far from simply asking respondents a question such as "Do you intend to use drugs some time in the future?" (Horowitz & Sedlaack, 1973).

Considerably more sophisticated measures were used in a concurrent (correlational) study of marihuana and alcohol use in relation to demographic, family history, and attitudinal variables by Biggs, Orcutt, and Bakkenist (1974). They administered questionnaires to 1,012 University of Minnesota students in liberal arts, business administration, forestry, home economics, and engineering. Their major objective was to determine whether or not the sociodemographic correlates of marihuana use differed from those associated with alcohol use. Of 23 variables tested, only one (attitudes toward parents) was related to marihuana but not to alcohol use. None of the other variables showed statistically significant differences between the correlates of marihuana use and alcohol use. The familiar measures of religiosity, church attendance, and peer pressures and practices were related to levels of usage of both drugs. Interestingly, only 15% of males who did not use marihuana also did not use alcohol; however, of non-alcohol users, 92% also did not use marihuana.

The above investigations are the major ones conducted since the Braucht et al. review, but a number of other studies also have been conducted. These additional studies are summarized briefly in Table 1.

The studies summarized here represent a hodgepodge of instruments, sampling plans, populations, definitions of drug use or nonuse, types of drugs studied, validation and prediction strategies, and statistical techniques. As such, a summary of the substantive findings is difficult and must be taken at best as tentative. Nonetheless, the following personal attributes, personality characteristics, attitudes and opinions, social or interpersonal variables and behaviors, and methodological considerations seem to merit attention in subsequent studies of patterns of drug use/nonuse/abuse:

1. Personal Attributes

   sex, race, age, measured intelligence, college major or intended occupation, vocational interests

2. Personality Characteristics

   autonomy (independence), achievement orientation, sociability, socialization, tough minded vs. tender minded, breadth of interests, impulsivity, flexibility, openness to experience, social acuity, exhibition, social recognition

3. Attitudes and Opinions (toward)

   authority, parents, health, fatalism, philosophical hedonism, societal institutions, religiosity, school, concern for future, tolerance of deviance, social activism, drugs

4. Social or Interpersonal Variables

   peer conformity; parental conflict; social anxiety; rebellion; morality; social conformity; sensual hedonism; pleasure seeking; alienation; conventionality;

orientation of parents toward tobacco, alcohol, and other drugs; socio-economic background

5. Behaviors

cigarette use; alcohol use; academic achievement; dating; petting; sexual intercourse; church attendance; belonging to churches, clubs, etc.; obedience

6. Concurrent Relations vs. Longitudinal Prediction

So far, few studies have been predictive. Most relationships (both concurrent and longitudinal) have been modest at best. Studies rarely have been done to identify differential patterns according to different drugs and patterns of use. More individualized strategies need to be tried.

7. Situational and Contextual Variables

Almost no studies have given any systematic attention to situational factors or process variables in trying to understand drug resistance and use/abuse.

8. Developmental Processes

Several developmental theories may be applicable to explaining and possibly predicting drug use among young people. The psychosocial development theory of Eric Erikson (1950) may be used to handle several of the findings reported above. If it can be assumed that young adults (high school and early college-age) are in Erikson's sixth stage of development, "intimacy versus isolation," then it might be predicted that young people who feel isolated and alone would turn to drugs to alleviate these feelings. The notion of isolation corresponds fairly closely with the sociological concept of "alienation." Clarke and Levine (1971) present evidence that high school marihuana users are to some extent politically and socially alienated. However, it should also be noted that Clarke and Levine found that marihuana users were also more politically and socially aware. This, then, might give some evidence, albeit tenuous, that young drug users may be more likely to feel uninvolved in the political and social spectrum and perhaps tend to shun involvement in these areas.

Further evidence that might indicate that young drug users experience a greater degree of isolation than nonusers is provided by Williams (1970) who determined that college-age problem drinkers are quite unconcerned about others and de-emphasize relationships with others.

In a somewhat similar vein, Pittel, Calef, Gryler, Hilles, Hofer, and Kempner (1971) have developed a developmental theory of psychedelic drug use based upon interviews and observations of 250 volunteer subjects from the hippie community in San Francisco. Pittel et al. hypothesize that the ego formation of their subjects has been limited by early family stresses and early sensory and mental overload. This has resulted in an impairment in the capacity for object relations and an inability to control impulses and feelings. Other stresses during childhood and adolescence have resulted in additional impairments of reality testing, judgment, attention, concentration, and other ego functions.

Questionnaire and Inventory Development and Data Gathering Considerations

Horan, Westcott, Vetovich, and Swisher (1974) provide just one of what could be many examples of the effects of differences in surveying methodology on the results obtained in studies such as those we have been reviewing. They used three different methods (personal interviews concerning use of legal and of illegal drugs and an anonymous questionnaire) to obtain self-reports about drug use from 66 respondents. They found no dif-

Table 1.

Recent Studies Related to Drug Use/Nonuse

Investigators	Subjects	Drugs Studied	Types of Study	Type of Variables	Results
1. Lerner, Lindner & Drolet (1974)	497 parochial high school students; 119 public high school students	Alcohol Tobacco Hallucinogens Marihuana Opiates Barbiturates	Descriptive (Incidence of use for different grade levels)	Questionnaire about drug use	Use among seniors ranges from 14% for LSD to 72% for marihuana to 96% for alcohol.
2. Frenkel, Robinson, & Fiman (1974)	2042 high school students grades 7-12, Southwest United States	Hallucinogens Marihuana Barbiturates	Concurrent (correlational)	Drug Attitude Survey (demographic, attitudinal, drug use history information)	No significant sex or race differences; drug users tended to have parents separated or divorced, did not enjoy school, saw world as "bad," have unsatisfying relationships with parents & friends, and drink alcohol.
3. Victor, Grossman, & Eisenmann (1973)	871 college-oriented high school students; grades 8-12.	Marihuana	Concurrent (correlational)	Personal Opinion Survey (creativity & adventuresomeness); California F scale (authoritarianism); Internal Sensation Novelty Seeking Scale; Manifest Anxiety Scale; demographic & drug use history questionnaire	Significant increase in frequency & length of marihuana use with higher grade level; significant relationship between religion and frequency and length of use; in both samples internal sensation novelty seeking increased and authoritarianism decreased as frequency of use increased; as frequency of use increased in the college-oriented group, creativity and adventuresomeness increased, while GPA decreased
4. Stokes (1974)	738 college students	Alcohol Tobacco Hallucinogens Marihuana Opiates Barbiturates	Concurrent (correlational)	Personological, attitudinal, & drug use history questionnaire	Drug users tended to score high on measures of dissatisfaction with and a desire to change oneself, sensual hedonism, philosophical hedonism, and general tendency to use drugs; users were low on fear of personal reaction to drugs and respect for illegality of psychedelic drug use. Principled nonusers had the reverse pattern of scores.
5. Lawrence & Velleman (1974)	1416 high school students	Alcohol Tobacco Marihuana Barbiturates	Concurrent (correlational)	Questionnaire about drug use history of self, parents, & friends	Parents of drug users abused alcohol (drinking frequently and in large amounts), fought frequently, and tended to be divorced or separated. Mothers' smoking habits and friends' drug use were significantly associated with students use of all drugs.
6. McLaughlin (1974)	136 college students (equal numbers of nonusers, moderate users, heavy users, and polydrug users).	Marihuana	Concurrent (correlational)	California Psychological Inventory, Guilford-Zimmerman Temperment Scale, and 16 PF Questionnaire.	Nonusers and pooled users were significantly different on the communality, sociability, socialization, and capacity for status scales of the CPI and on the tough-minded vs. tender-minded scale of the 16 PF.
7. Smart & Whitehead (1974)	Canadian high school students surveyed in six studies during 1972-1973; grades	Alcohol Hallucinogens Marihuana Opiates	Descriptive (Incidence of type of drug use) and concurrent (correlational)	Dean Alienation Scale, demographic and drug use history questionnaire.	Use among students ranges from 8% for LSD to 20% for marihuana to 42% for tobacco to 66% for alcohol. Males were consistently more frequent users of alcohol, tobacco, marihuana, and

Table 1. (continued)

Investigators	Subjects	Drugs Studied	Types of Study	Type of Variables	Results
	7-13; N not specified.	Barbiturates			hallucinogens. Tranquilizer use was more characteristic of females. Drug users tended to have parents separated or divorced and feel normless and powerless.
8. Knecht, Cundick, Edwards & Gunderson (1972)	145 students at Appalachian State University in North Carolina	Marihuana	Concurrent (correlational)	Comrey Personality Scale, 16 PF Questionnaire, questionnaire about drug use history.	No significant sex differences. Drug users tended to score low on the social conformity, orderliness, and activity Comrey Personality Scales; low on the superego strength and controlled scales; and high on the tender-minded scale of the 16 PF. The best predictor of drug use was the social conformity scale score.
9. Holroyd & Kahn (1974)	140 students at the University of Miami	Hallucinogens Marihuana Opiates Barbiturates	Concurrent (correlational)	College Behavior Questionnaire (demographic and drug use information); Personality Research Form; Cooperative Reading Test	Use ranges from 34% for no drugs to 27% for hallucinogens to 64% for marihuana. Heavy users held more liberal political beliefs and were judged to be sloppy. Males who were heavy users had low GPA's and high scores on the impulsivity, endurance, and understanding scales. Female heavy users scored high on the understanding, autonomy, achievement, and play scales.
10. Sadava (1973)	161 college students	Marihuana	Concurrent and predictive (correlational)	Personological, attitudinal, & drug use history questionnaire	Frequency of marihuana use was significantly correlated with measures of attitudinal tolerance for use, negative functions for use, and social support for use in both the concurrent and predictive studies. Intensive pattern of use was related to high expectations for independence, high attitudinal tolerance for use, high positive function for marihuana, and psychedelic use, high social support for use, and low negative function scores. Social support scores were the best predictors of drug use.

ferences between results for legal drug use between interview and questionnaire responses. However, 23% fewer persons (59% vs. 36%) reported using marihuana or hash in the interview than in the anonymous questionnaire. The authors conclude that these results can legitimately call into question the validity of much drug use research which has relied on self-report information collected via interviews.

As mentioned, this is but one example of the importance of taking careful account of survey research methodology at all states in the conduct of studies in the area of drug usage. The states of such research include (1) conceptualization, (2) development and scaling of questionnaires or inventories, (3) choosing appropriate subject populations and sampling properly from them, (4) gathering information from respondents, and (5) interpreting and analyzing the information obtained. Entire textbooks have been written in an effort to explicate the important features to be aware of so as to avoid serious errors at each of the above stages. Obviously we cannot go into detail about these matters in this paper. The beginner will find books by Berdie and Anderson (1974), Payne (1951), or Edwards (1957) to be very helpful for the design and development of questionnaires and attitude scales. More advanced readers may want to refer to Torgerson (1958), Parten (1950), or Backstrom and Hursh (1963).

SUMMARY

Classic psychometric theory has typically assumed that errors of measurement are randomly distributed across persons being measured and that errors of the same magnitude are essentially equivalent regardless of where they occur along the score distribution. Both assumptions are frequently wrong. Many researchers have shown that magnitudes of errors of measurement may differ in a stable manner from person to person. That is, persons have been shown to be differentially predictable. Errors of the same size obviously also can have very different effects and very different associated costs, as, for example, in the contrasting costs of false positive or false negative errors in medical diagnosis. This paper argues strongly for placing more emphasis on nonlinear prediction models such as moderator analyses and configural or actuarial scoring in studies of drug related behavioral outcomes. The argument stems primarily from our survey of findings reported by many recent prediction studies of drug resistance/use/abuse. The findings yield a plethora of attitudinal, demographic, interpersonal, behavioral, and personality correlates of different types of drug related behavior. Gains in predictive and diagnostic accuracy can best be realized by developing several prediction systems shown empirically to be optimal for particular subgroups, particular developmental patterns, and particular behavioral outcomes.

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APPENDICES

APPENDIX A

ITEMS COMPRISING A PRIORI SCALES IN THE MINNESOTA STUDENT QUESTIONNAIRE

APPENDIX B

RESULTS OF FACTOR ANALYSES OF ITEM RESPONSES TO THE MINNESOTA STUDENT QUESTIONNAIRE: DIMENSION TITLES AND ITEMS IN EACH DIMENSION

APPENDIX A

Items Comprising A Priori Scales in the Minnesota Student Questionnaire

Scale I: Authority

Items with content related to smoking:

- Laws against smoking are unfair to kids my age.
- Laws against smoking are silly.
- Laws against smoking are made to protect kids my age.

Items with content not related to smoking:

- I get a lot of kicks out of doing things I know are wrong.
- It's fun to do the opposite of what your teachers tell you just to get them mad at you.
- I like to do things I know I shouldn't do.
- I do a lot of things I know are wrong, and it doesn't bother me a bit.
- It is all right to get around the law if you don't actually break it.
- There is nothing wrong with breaking a law if you don't actually get caught.
- I think I am stricter about right and wrong than most other kids.
- It is better to do what you think is right, no matter what your friends say about it.

Scale II: Peer Group

Items with content related to smoking:

- I like to be around kids who are smoking.
- About the best way to become popular is to be the first one among your friends to try new things--such as smoking, drinking, and things like that.
- Smoking is a good way to calm you down when you are with a group of kids.
- I would feel like a sissy if the rest of my friends were smoking and I weren't.
- I hate to be the only one in the group that isn't smoking.
- Kids are embarrassed to be with someone who doesn't know how to smoke.
- You have a better chance of making friends with some kids if you smoke.
- Kids that smoke have more friends than kids that don't smoke.

Items with content not related to smoking:

- I do pretty much what the kids around me do.
- I like to do what the rest of the kids are doing even if I know it is wrong.
- I like kids who do things "for kicks."
- A person should accept the ideas and do the things that the group of kids he runs around with wants him to do.
- I like to be loyal to my friends.
- Kids can pretty easily change me even though I may think that my mind is already made up on a subject.
- If a kid wants to be popular, he should try to act like other kids who are already popular.

Scale III: Parents

Items with content related to smoking:

- If my parents want to smoke, that is their business. If I want to smoke, that is my business.

Items with content not related to smoking:

- My parents have disapproved of my friends.
- My parents have been too strict with me.
- I have often gone against my parents' wishes.
- My parents seem too old-fashioned in their ideas.
- My parents and I live in different worlds as far as our ideas are concerned.
- My parents often object to the kind of people I go around with.
- I feel that my parents are disappointed in me.

Scale IV: Impulsiveness

Items with content related to smoking:

- A person cannot help it if he takes up smoking.

Items with content not related to smoking:

- I like to try new things just for the heck of it.
- A person needs to "show off" a little now and then.
- I shrink from facing a problem.
- If someone dares me to do something, I'll do it almost every time.
- I do many things that I think are bad, but I don't have enough will power to stop doing them.

- I usually do what makes me feel happy here and now, even if I think I will be sorry for it sometime later.
- I like to avoid responsibilities and obligations.
- I would do almost anything on a dare.
- I often speak and act without thinking.

Scale V: Health

Items with content related to smoking:

- Smoking is harmful.
- Most doctors believe smoking causes cancer.
- Cigarettes cause many diseases besides cancer.
- Smoking is bad for the lungs.
- If cigarette smoking were really harmful, people wouldn't be allowed to buy cigarettes.
- Even if I did smoke, there wouldn't be much of a chance that I would get cancer.
- Kids who smoke are probably not as healthy as kids who don't smoke.
- Smoking does not cause lung cancer.
- Filters take all of the harmful things out of cigarettes and make them safe to smoke.
- Most doctors would not smoke if they thought smoking caused cancer.
- Smoking must not be harmful because so many doctors smoke.

Items with content not related to smoking:

- No items not related to smoking.

Scale VI: General Attitudes Toward Smoking

Items with content related to smoking:

- Smoking is expected of me.
- I do not know any good reasons why I should not smoke.
- It's okay to smoke if you don't inhale.
- Smoking helps you to relax when you are nervous.
- I know a lot of good reasons for smoking.
- Kids should be allowed to smoke if they want to.
- If your parents smoke, it is okay for you to smoke.
- If it is all right for parents to smoke, it is all right for their kids to smoke.

- It's worth saving your money in order to be able to buy cigarettes.
- There are a lot of good things about smoking.
- Millions of men and women who smoke do not want to, but they cannot stop.
- Kids who smoke do not smell as clean and fresh as kids who do not smoke.
- There are more bad things about smoking than good things.
- Anyone who starts smoking is foolish.
- It is a real accomplishment not to smoke.
- It is harder to keep your clothes clean when you smoke.
- Anyone who starts smoking in high school is just trying to show off.
- Smoking is a disgusting and dirty habit.
- Smoking usually becomes a habit that is hard to break.
- A kid that does not smoke should be admired.
- There are more bad things about smoking than good things.
- Smokers smell unpleasant to many people who do not smoke.

Items with content not related to smoking:

- No items not related to smoking.

Scale VII: Appearance

Items with content related to smoking:

- Kids who smoke always seem to look relaxed.
- It looks good to see another kid smoke.
- Kids who smoke look grown up.
- Kids look more sophisticated when they are smoking.
- People smoke in order to show off.

Items with content not related to smoking:

- Good manners and making a good impression are important to me.
- I like it when other kids notice me and comment on my appearance.

Scale VIII: Sexual Attractiveness

Items with content related to smoking:

- Smoking makes girls more attractive to boys.
- Girls like boys who smoke.

- I really like to see a girl smoke.
- It's more fun on a date if you smoke.
- A girl has a better chance of getting a date if she smokes.
- Boys who smoke have more fun with girls.

Items with content not related to smoking:

- No items not related to smoking.

Scale IX: Concern for Future

Items with content related to smoking:

- No items related to smoking.

Items with content not related to smoking:

- There is no reason to worry about things you do now that might cause you poor health when you are older.
- The future is too far away to worry about it.
- Kids should enjoy themselves as much as they want and not worry too much about what may happen to them when they get older.

Scale X: Extroversion

Items with content related to smoking:

- No items related to smoking.

Items with content not related to smoking:

- I find it easy to be the life of the party.
- I like large, noisy parties.
- I like to go out with attractive persons of the opposite sex.
- I am self-conscious and shy when meeting new kids.

APPENDIX B

Results of Factor Analyses of Item Responses to the Minnesota Student Questionnaire: Dimension Titles and Items in Each Dimension

Scale I: General Attitudes Toward Smoking

Items with content related to smoking:

- It looks good to see another kid smoke.
- I like to be around kids who are smoking.
- Laws against smoking are silly.
- Smoking is a good way to calm you down when you are with a group of kids.
- I know a lot of good reasons for smoking.
- Kids should be allowed to smoke if they want to.
- If your parents smoke, it's okay for you to smoke.
- If it is all right for parents to smoke, it is all right for their kids to smoke.
- It is worth saving your money in order to be able to buy cigarettes.
- There are a lot of good things about smoking.
- Smoking is harmful.
- There are more bad things about smoking than good things.
- Anyone who starts smoking is foolish.
- Kids who smoke are probably not as healthy as kids who don't smoke.
- Anyone who starts smoking in high school is just trying to show off.
- Smoking is a disgusting and dirty habit.
- There are more bad things about smoking than good things.
- People smoke in order to show off.
- Smoking is a waste of money.
- It is morally wrong to smoke.

Items with content not related to smoking:

- No items not related to smoking.

Scale II: Peer Conformity, Social Anxiety, Impulsiveness

Items with content related to smoking:

- No items related to smoking.

Items with content not related to smoking:

- I like to do what the rest of the kids are doing even if I know it is wrong.
- I have often gone against my parents' wishes.
- I shrink from facing a problem.
- I do many things that I think are bad, but I don't have enough will power to stop doing them.
- I usually do what makes me feel happy here and now, even if I think I will be sorry for it sometime later.
- Kids can pretty easily change me even though I may think that my mind is already made up on a subject.
- My parents often object to the kind of people I go around with.
- I feel that my parents are disappointed in me.
- I am self-conscious and shy when meeting new kids.
- I like to avoid responsibilities and obligations.
- I often speak and act without thinking.

Scale III: Smoking and Sexual and Social Attractiveness

Items with content related to smoking:

- Smoking makes girls more attractive to boys.
- Girls like boys who smoke.
- About the best way to become popular is to be the first one among your friends to try new things--such as smoking, drinking, and things like that.
- I really like to see a girl smoke.
- It's more fun to be on a date if you smoke.
- I hate to be the only one in the group that isn't smoking.
- A girl has a better chance of getting a date if she smokes.
- You have a better chance of making friends with some kids if you smoke.
- Kids look more sophisticated when they are smoking.
- Kids that smoke have more friends than kids that don't smoke.
- Boys who smoke have more fun with girls.

Items with content not related to smoking:

- No items not related to smoking.

Scale IV: Live for the Present; Fatalistic Lack of Concern for the Future

Items with content related to smoking:

- Even if I did smoke, there wouldn't be much chance that I would get cancer.
- A person cannot help it if he takes up smoking.

Items with content not related to smoking:

- There is no reason to worry about things you do now that might cause you poor health when you are older.
- The future is too far away to worry about it.
- Kids should enjoy themselves as much as they want and not worry too much about what may happen to them when they get older.

Scale V: Risk-Taking Rebelliousness

Items with content not related to smoking:

- I get a lot of kicks out of doing things I know are wrong.
- I like kids who do things "for kicks."
- If someone dares me to do something, I'll do it almost every time.
- It's fun to do the opposite of what your teachers tell you, just to get them mad at you.
- I like to do things I know I shouldn't do.
- I do a lot of things I know are wrong, and it doesn't bother me a bit.
- There is nothing wrong with breaking a law if you don't get caught.
- I would do almost anything on a dare.

Scale VI: Exhibition and Social Activism

Items with content not related to smoking:

- I like to try new things just for the heck of it.
- A person needs to "show off" a little now and then.
- I find it easy to be the life of the party.
- I like large, noisy parties.
- I like to go out with attractive persons of the opposite sex.

Scale VII: Generation Gap

Items with content not related to smoking:

- My parents have been too strict with me.
- My parents seem too old-fashioned in their ideas.
- My parents and I live in different worlds as far as our ideas are concerned.

Scale VIII: Smoking is not Harmful

Items with content related to smoking:

- If cigarette smoking were really harmful, people wouldn't be allowed to buy cigarettes.
- Smoking does not cause lung cancer.
- Filters take all of the harmful things out of cigarettes and make them safe to smoke.
- Smoking must not be harmful because many doctors smoke.

Scale IX: Smoking is Dirty

Items with content related to smoking:

- Kids who smoke do not smell as clean and fresh as kids who do not smoke.
- It is harder to keep your clothes' clean when you smoke.
- Smokers smell unpleasant to many people who do not smoke.

Scale X: Morality and Social Conformity

Items with content related to smoking:

- Smoking is expected of me.
- It is a real accomplishment not to smoke.
- A kid who does not smoke should be admired.

Items with content not related to smoking:

- I think I am stricter about right and wrong than most other kids.
- I do pretty much what the kids around me want to do.
- A person should accept the ideas and do the things that the group of kids he runs around with wants him to do.
- It is better to do what you think is right, no matter what your friends say about it.
- If a kid wants to be popular, he should try to act like other kids who are already popular.

A SOCIAL PSYCHOLOGICAL APPROACH TO SUBSTANCE ABUSE CONSTRUCT VALIDITY: PREDICTION OF ADOLESCENT DRUG USE FROM INDEPENDENT DATA SOURCES

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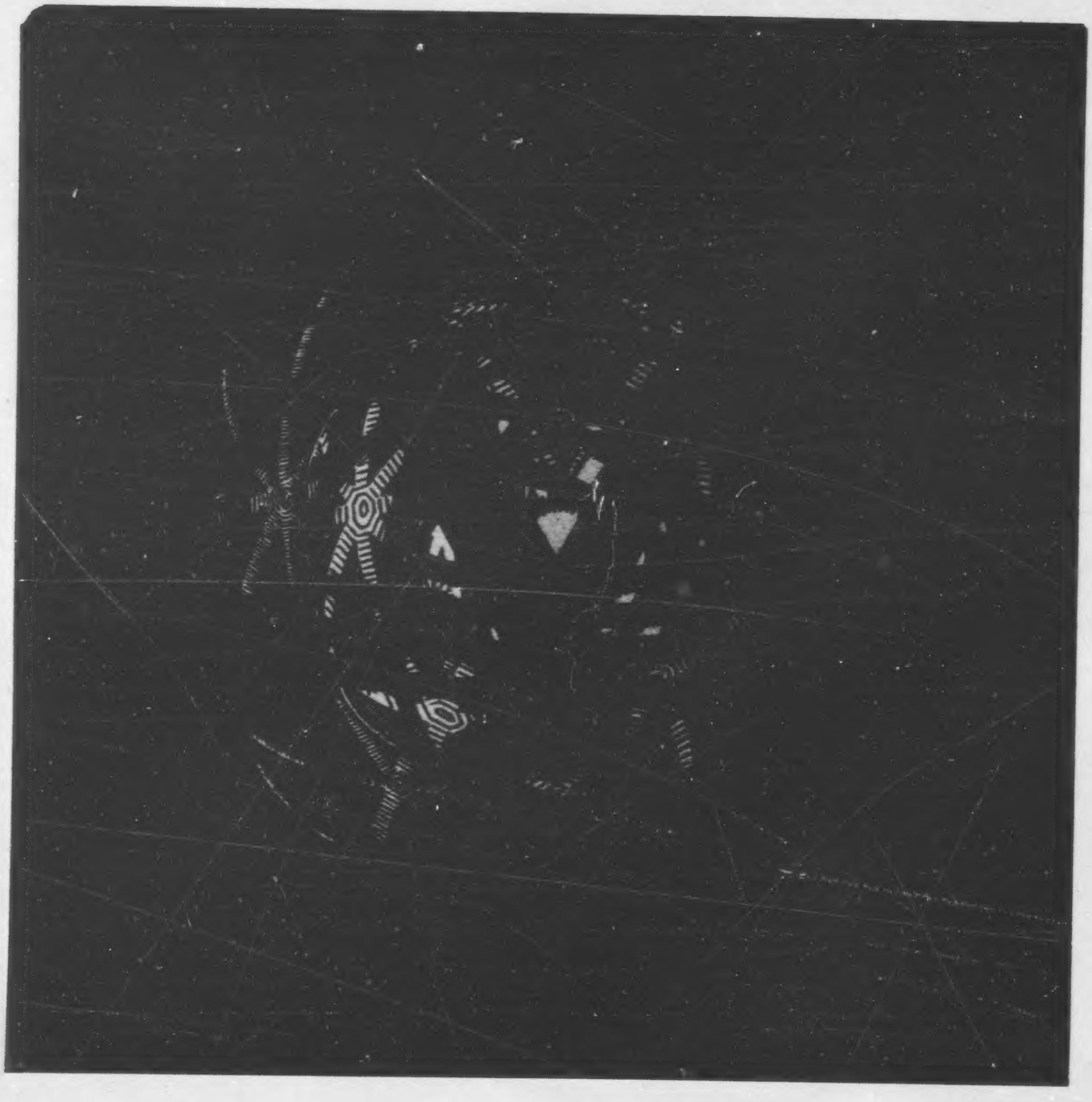

Plate 11

A SOCIAL PSYCHOLOGICAL APPROACH TO SUBSTANCE ABUSE CONSTRUCT VALIDITY: PREDICTION OF ADOLESCENT DRUG USE FROM INDEPENDENT DATA SOURCES

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Any explication of research aimed at understanding and predicting the personalities and life-styles of drug abusers must come to grips with at least three fundamental concerns: the nature of the criterion to be predicted, characteristics of the predictors to be utilized, and predictive methods to be emphasized. Some of the general issues in these areas will be discussed, theoretical and empirical principles relevant to prediction will be reviewed, and predictive research stemming from data sources minimally confounded by method variance will be evaluated. However, it is also important to be cognizant of metatheoretical issues related to this research, some of which we review first.

METATHEORETICAL AND METAEMPIRICAL CONCERNS

It seems that certain general issues regularly arise in the context of research discussions, and it may be prudent at least to consider them. First and foremost is the question of why one should engage in predictive research at all.

Ethical Principles Require us to Affirm and Work Towards the Goal of Relieving Actual and Potential Suffering of Drug and Alcohol Abusers Who Voluntarily Request Assistance

It may seem incongruous to a scientific panel to be reminded about this important goal of prediction research, but it must be remembered that many predictive enterprises are under attack in our society at the level of public opinion and in the courts. The problems of potential illegal discrimination arising from tests, unwise "tracking" of students as a consequence of valid predictive relationships, and early identification and "labeling" of problem cases, with their attendant self-fulfilling prophesies, should help us remember that pure research is not always translated effectively into socially useful action. The potentially destructive consequences of classifying children has also been emphasized in the three-volume work *Issues in the Classification of Children* and *The Futures of Children* (Hobbs, 1975a,b), a series of reports stemming from concern over these issues as expressed by the Secretary of Health, Education, and Welfare. The sociological labeling perspective casts a professional eye on these problems (Rains, Kitsuse, Duster, & Freidson, 1975), but the concerns extend outside professional circles. The public's sensitivity on this issue can be gauged by its negative reaction to a proposal, made by a President some years ago, that children be tested for their potential criminal leanings. The social control potential of predictive and classificatory research rightfully concerns citizens. It seems to us that our research should be aimed toward easing the personal cost of drug abuse, thereby affecting the social cost. We can most easily justify predictive and interventive programs if the goal is one of optimally helping clients who seek help voluntarily, and we may need to keep such a goal in mind for future work.

The Ethics of Research Imply Limitations to Scientific Methods and Findings

Human rights and welfare have rightly become primary concerns in the conduct of research. While the type of research we are concerned with generally has little or no risk attached to it, nonetheless procedures for guaranteeing informed consent require us to use volunteer subjects who may not represent the populations of particular interest to our scientific models. The generalizability of research results can therefore be severely limited, and the effects of ethics on our conclusions must be evaluated. On the other hand, applications of the findings may occur in highly similar volunteer contexts so that volunteer bias need not be an overwhelming issue.

The Intended, Ultimate Application of Research May Have Implications for the Conduct of Research

Predictive studies, of course, are relevant to the pure-science ideal of understanding phenomena; but the times also require us to be concerned with the potential usefulness of our results. One applied goal could be to build a longitudingally-predictive model which would enable the early identification of potential drug abusers; identified individuals could presumably receive special beneficial intervention. Should such a goal indeed be considered important, research must be aimed at the criterion of drug *abuse*, not the criterion of drug *use*. The variables predicting abuse may not be the same as those predicting use.

Society Has a Right to Demand Convergent and Discriminant Validity for Applied Predictive Models

In the context of pure research, psychometricians have come to appreciate the principles of construct validity, with their further operationalization through the demonstration of convergent and discriminant validity. However, even in the realm of pure research there is a gap between theory and practice, with very few extant studies being concerned with the problem of demonstrating both how different measures converge on the same construct and how they are different from other potentially similar constructs. If pure research is so sloppy, can one expect applied research to be more exacting? Yet, any application of such research must demonstrate not only that one can predict the desired criterion (e.g., drug abuse) but also that one is *not* predicting related but conceptually independent criteria. To be specific, we may be making great progress at predicting drug use; but if the predictive equation equally well (or possibly even more accurately) predicts liberal or radical political beliefs, the social ideals of this country may not accept implementations of such predictive models. Attention ought to be focused on differential prediction or classification as well as simple prediction.

Some Public Policy Decisions May be Possible Without Further Scientific Research

The notion that "further research is necessary" has been accepted by all modern scientists; indeed, it is hardly possible to publish a scientific paper without an adequate discussion of directions for future research. Even the worth of a theory has been said to hinge on the possibility of generating further research. Although we subscribe fully to the necessity for further research in most problem areas, save those which have become totally uninteresting or completely solved, as experts speaking to the public we should also recognize that there are areas of public policy that can be addressed without waiting for further research. Most obvious is the fact that drug abusers already exist and do not need to be predicted, intervention programs can be implemented for such persons, and so on. It is also well known that epidemics of drug use depend strongly on availability, and one method of dealing with availability is to find effective methods to restrict supply. Nothing further need be known about the characteristics of users to implement policies regarding supply restriction. Furthermore, many public programs are based on value decisions or on cost and not on science.

Thus, an accurate view of our tasks requires us to see our limitations, but how extensively we may want to discuss this issue is quite another matter. Of course, public policy and research should usually be intertwined, with public programs having a built-in research base to evaluate their effectiveness; but that is quite another issue.

NATURE OF THE CRITERION

Numerous researchers have a greater depth of experience in drug abuse research than we have, but it is important to raise certain basic issues regarding the criterion to be predicted. We do not deal here at great depth with the substantive issues; some of these are discussed in the paper by Eichberg and Bentler (1975) included in this volume.

Univariate or Multivariate Criteria?

The prediction of drug use or abuse is often considered in the framework of a simple regression model, in which there are numerous predictors and a single criterion variable. Are we entirely certain that our criterion is or should be a single variable? Some prior research data has shown consistently positive intercorrelations among drug use of a variety of sorts, suggesting that the creation of a single criterion score might be legitimate on the basis of the existence of a common factor (Blum, 1969). On the other hand, other research has suggested that the correlates and predictors of drug use differ for a variety of drugs, such as alcohol, narcotics, and psychedelics, implying that the criterion is multidimensional (Braucht, Brakarsh, & Follingstad, 1973). Finally, theoretical orientations such as Goode's (1974) sociological theory or Johnson's (1973) subculture theory suggest that certain interpersonal variables are the "causes" of amount of drug usage, particularly in regard to marihuana. Yet, such subcultural and peer effects may well be absent from other types of drug use, such as that of the physician addict or the housewife barbiturate abuser, so that there are probably multiple types of drug use (McGlothlin, 1975). It is also possible to make logical distinctions between the use-abuse continuum and a legal-illegal continuum (Ray & Wilson, 1975), and one would thus expect to find different correlates of the various combinations of legal/illegal-use/abuse. On the basis of theory, then, the criterion of drug abuse or use could be expected to be multidimensional. As a consequence, one may have to deal with the problem of selecting several sets of predictors for future studies rather than only one set.

Use Versus Abuse

Virtually all predictive drug research has dealt with the issue of predicting the amount of usage of drugs or alcohol. While numerous problems also exist in obtaining appropriate indices of use (Eichberg & Bentler, 1975), the conceptual leap from use to abuse needs to be identified. In this kind of research, the assumption is that heavy usage is closely synonymous to abuse. Perhaps this assumption is true, or perhaps it needs to be made because of the methodological difficulties involved in measuring abuse. Is drug taking or its consequences of greater import? A major part of society's interest in the drug area no doubt stems from the potential consequences of abuse, such as increased or decreased aggressiveness, and this concern has been translated into research effort (Tinklenberg, 1974). However, the literature on the prediction of aggressive consequences of drug use is sparse compared to the literature on the prediction of use per se. Research on consequences of drug use could include measures of negative effects on the individual (e.g., poor health or poor psychological functioning) and on society (e.g , criminal patterns). Perhaps the issue of a specifically drug-relevant criterion other than use needs some careful attention.

Drug Use or Drug Use Leadership?

A similar, related criterion question must deal with the issue of whether it is drug usage (or excessive usage or abuse) that makes for the most meaningful criterion variable in future research or whether such applied research is not better served by attempting to predict criteria that would be more likely to allow one to predict and understand the course of drug-taking patterns and their correlates in our society. In particular, perhaps a personal characteristic having implications for drug use or for unfortunate correlates of drug use may be a more appropriate criterion variable than use per se. Specifically, since when exposed to the availability of drugs some people become leaders in the adoption of drug use patterns and others become clear rejectors of those patterns, it may be particularly important to attempt to predict such leadership or rejection patterns. Further, in view of the important role attributed to drug selling in the perpetuation and spread of drug use patterns (Blum, 1972a; Johnson, 1973) participation in drug dealing should be an important criterion. Since it is probably important to predict epidemics of use (Richards, 1974), which in principle will be a difficult task, we may need to concentrate on criterion variables such as selling which have at least potential relevance to this problem. In order to decide such an issue, it may be necessary to arrive at some temporary decisions regarding the point of probable application of future intervention efforts. If intervention will be aimed at attempting to stop the growth of a destructive subcultural pattern, it may be appropriate to attempt to identify the leaders in innovation.

Operational Definitions

Even granting that the above questions have been satisfactorily resolved regarding predictive efforts, there always remain the crucial, easily overlooked problems associated with specifying operational definitions for the criteria to be utilized. It seems wisest to accept input from the relevant expert committees such as the SAODAP committee on definitions and nomenclature. In reviewing available instruments regarding their precise operationalization and quantification of criterion drug use or abuse variables, it is quite clear that there is a bewildering array of options utilized. It is likely that the predictive relationships encountered will vary as a function of the specific criterion chosen. Some of these issues are discussed by Eichberg and Bentler (1975).

CHARACTERISTICS OF PREDICTORS

In this section certain structural and general measurement considerations in relation to the choice of predictor variables are emphasized. It will be obvious that the particular set of predictors considered for possible relationship to the criterion will depend upon conclusions that one has reached regarding the nature of the criterion, as described above. In addition, the model and research methods used for defining adolescents at risk for drug abuse can have an influence on this choice (see Garmezy and Streitman, 1974, for a related perspective).

Self-report Measures

Virtually all research on drug and alcohol use among adolescents has used the questionnaire as its basic methodological tool. Not only is the variable of drug use typically defined in terms of questionnaire self-report, but correlates and predictors of this variable, whether demographic, psychosocial, or intrapersonal, are equally readily defined by self-report operations. While the self-report questionnaire should continue to represent a major avenue of data gathering and hypothesis testing because of its easy and inexpensive administration and because of its capability of covering a variety of content areas, including attitudes, interests, personality, demography, and perceived environment, it should be remembered that this social science tool has been under attack since its invention a half-century ago. In particular, as the ideas of construct validity (Cronbach & Meehl, 1955) and multimethod-multitrait validation (Campbell & Fiske, 1959) have become integral concepts in social psychological approaches to measurement, it has become clear that self-reports can be biased and that data gathered from independent sources should be obtained for purposes of validation and method-free prediction. Perhaps we should reconsider our very heavy reliance upon self-report questionnaires.

Reports by Peers and Parents

Knowledgeable informants can provide valuable, method-free information about a target individual. Some researchers recently have used these methods of data gathering for both predictive and validational purposes. Some of this work is reviewed in the final section of this paper. In addition, social units such as the family can provide measures of the social environment as assessed, for example, by Mehrabian and Russell's (1974) theory-based measures for environmental psychology or by Moos' (1975) more empirical family environment scales. In the adolescent substance abuse area, however, environmental measures tend to be based primarily on self-report (e.g., Jessor & Jessor, 1973; Jessor, Jessor, & Finney, 1973).

Behavior Observation by Experimenters

Although informal reports by anthropological and sociological observers often serve fruitful purposes in the specification of hypotheses, precise behavioral measures are needed in quantification attempts for descriptive or predictive purposes. Behavior rating scales not only have become popular in clinical research but have been emphasized in the social psychological literature for their value in providing information that is freed from the biases and expectations of the subject himself. It is well known that behavior observation, as practiced in particular by operant practitioners in psychology (Jones, Reid, & Patterson, 1975), tends to be a difficult, expensive, and time-consuming task. Yet, one may wish to question whether it has any important role in future research in the drug abuse area.

Performance Testing

In contrast to self-report measures that tend to deal with reports of typical attidues, interests, personality patterns, and the like, performance measures emphasize the maximum possible performance that can be obtained by a given subject in a relatively realistic testing situation (Fitzpatrick & Morrison, 1971). Educational institutions usually obtain maximum performance data, where a subject is told to do as well as he possibly can on a given test; but simulation of realistic situations could be improved even in educational contexts. In the drug abuse research area, psychopharmacological research typically involves dependent variables that are of a maximum performance nature, as in assessing the effects of marihuana on a complex driving-type coordination task (Klonoff, 1974). It may be relevant to raise the question of whether performance tests are appropriate to future predictive enterprises.

Psychophysiological Measures

It is certainly expensive, time-consuming, and sometimes uncomfortable for the subject in assessment situations that involve psychophysiological measures such as the galvanic skin response, urinary corticoid excretions, or hormonal assays. The assessment of some of these variables has proven beneficial in research identifying infants having high risk for schizophrenia (Mednick, 1969) and could prove to have a valid relationship to certain aspects of drug abuse (Chotlos & Goldstein, 1967).

Archival Measures

School, police, court, or clinic records and other official documents can provide independent data on variables of potential relevance to drug use (Robins, 1966). From the school situation, not only the oft-used grade point average but also the number of days absent, records of behavior difficulties, and other observations can provide nonreactive, useful predictive information. Being a dropout is a particularly important variable (Robins, 1972). Perhaps an attempt should be made to assess the potential relevance of such measures in contrast to self-reports.

Sociological Measures

Objective reports of environmental variables can also be obtained independently of the subject. For example, the census can provide valuable information regarding neighborhood socioeconomic status, the percentage of high school graduates in given census tracts, and the like. Indices of crime, as compiled by police departments for a variety of community subsections, can provide additional nonreactive but important sociological data. The census, as well as other federal agencies and community agencies, provides information regarding unemployment rates, welfare rolls, and other data of potential significance for predictive purposes.

SOME PRINCIPLES OF PREDICTION

Psychometric and statistical theory and experience with empirical predictive enterprises have led to some conclusions regarding prediction that may bear reviewing. In principle, the task confronting us is not very different from the task confronting the Office of Strategic Services in its predictive problems during World War II, the Institute of Personality Assessment and Research prediction program in predicting success for Air Force officers, or in such tasks as predicting neuroses or psychoses from the MMPI, to pick only a few illustrative psychological examples. It seems to make sense to review some of the principles that have been found useful and that could guide future research endeavors in this social science area; it certainly would seem relevant to evaluate future studies in the context of such principles. Secondary sources for these principles are such works as Anastasi (1968), Fiske (1971), Lord and Novick (1968), Mischel (1968), Tatsuoka (1971), Wiggins (1973), and appropriate recent *Annual Review* chapters. In-depth evaluation, unfortunately, is not possible here due to space limitations.

Situational and Environmental Variables Account for a High Proportion of Variance in Behavior

It is well known in the drug abuse area that the availability of drugs and peer group influences are strong determinants of drug usage. Certainly no one can take a drug that is not available, for example. The recent controversy in psychology regarding usefulness of personality variables as predictors has centered on the relatively dismal predictions made by measures that attempt to be cross-situational rather than situation-specific (Bem & Allen, 1974). Similarly, social learning theory and other theories have come to the conclusion that the poor empirical results make theoretical sense: behavior is generally situation-specific, cued by particular stimuli, and generated by particular, specific reinforcement histories.

From these empirical and theoretical perspectives, we clearly should be attempting to measure situational and environmental variables directly. For example, can one obtain an index of the availability of a particular drug in a particular community or in a particular junior high school? Can one obtain an index, perhaps independent of the subject, regarding environmental press toward drug use at a particular junior high school? Time spent in these directions would probably be fruitful and would go beyond measures of the perceived environment based on self-report.

The Best Predictor of a Future Behavior is Current Behavior

If one is attempting to predict drug use in the future, it is certainly important to measure current drug use. When predicting the future from the past, one is essentially dealing with a measurement situation involving the reliability of behavior predictors, and reliability coefficients will typically exceed validity coefficients.

Degree of Criterion-Predictor Similarity is a Major Determinant of Predictive Validity

A vast amount of research has shown that the more similar and logically related the predictor instrument is to the criterion variable, the more likely it is to succeed at predicting the criteria (Weigel, Vernon, & Tognacci, 1974). It is not at all surprising to note that numerous surveys find that drug use of a particular sort can be predicted from drug use of a slightly different sort. Similarly, it is not surprising to find that drug use can be predicted from alcohol use or smoking behavior. These variables are clearly more similar to drug use than, for example, responses to an inkblot perception test such as the Rorschach. Relevance is clearly an important issue to keep in mind in selecting predictors.

Method Variance in Psychological Measurement is Typically Large

Although there is long, disputed literature regarding the existence of certain response styles such as acquiescence or social desirability (Bentler, Jackson, & Messick, 1971), the conclusions of Campbell and Fiske (1959) regarding the relatively dismal showing of psychological measures when analyzed according to multitrait-multimethod validation still holds today. When high validity correlations are found, in accordance with the previous principle, they tend to be found within a single domain of measurement. Predicting self-report from another kind of self-report is not a particularly exciting achievement. Predicting a self-report measure from an independent report by an observer or from a behavior report is indeed an achievement. It is easy to be lured into selecting measures that share a particular method of measurement because of the potentially high correlation coefficients to be observed. However, prudence suggests that we also entertain other methods of measurement.

Linear Regression Models Are Almost Always Superior to Nonlinear Models

From time to time a complicated psychological model is presented for adoption in predictive and theoretical studies. For example, such a model may involve interactions among variables or other nonlinear relationships, either among the predictors or between the predictor variables and the criterion variable. Yet, exciting as nonlinear models are in principle, they have only rarely been shown to be more valid in cross validation than simple models based on linear combinations of predictor scores.

Standard Regression Models Require a Single Predictive Equation to Apply to All Subjects

Alternatives to the use of single nomothetic equations have been proposed many times (Frederiksen & Melville, 1954; Saunders, 1956; Ghiselli, 1956; Cleary, 1966; Hobert & Dunnette, 1967), and these idiographic alternatives have been shown to be superior to the standard model from time to time (Bem & Allen, 1974). Measurement or prediction for subgroups are logically appropriate procedures which should be further explored, but these procedures are difficult to compare to the standard nomothetic model in terms of overall accuracy of prediction. Typically they can raise validity coefficients, but the standard error of estimate will not decrease. Furthermore, increased validation can always be obtained by excluding subjects lying in the center of a distribution of predictor scores; but the gain is illusory (Abrahams, 1969; McNemar, 1969a). Perhaps time spent to develop moderator variables would be more fruitfully spent seeking improvements in validity through application of classic psychometric principles such as reliability (Ghiselli, 1963). A feature section of the June, 1972, issue of the *Journal of Applied Psychology* deals with these issues.

Predictive Models Account for Variation Around a Mean

Even when there is no relationship in the correlational sense between a criterion and a predictor variable, the regression equation specifies that the mean score on the criterion variable can be predicted for every individual. A significant correlation coefficient only adds predictive power to explaining variation around the mean. Since one of the tasks of theories and models in the drug abuse area is to account for the rapid shift in mean usage across time, data sources, variables, and experimental paradigms must be utilized that will allow one to predict changes in the mean usage itself. A simple cross-sectional study, for example, cannot do this.

Low Base-rate Activities Typically Cannot be Predicted Well

It is axiomatic in predictive research that there must be variation in the criterion variable for successful prediction to be obtained. When the criterion is dichotomous, such as drug abuse versus no drug abuse, or schizophrenic versus not schizophrenic, the variance in the criterion is specifically tied to the base-rate of the behavior in question. Extremely unlikely events, such as schizophrenia, as well as extremely likely events typically cannot be predicted with a great degree of accuracy. One solution to this dilemma is to redefine the population and to attempt to predict only within a subpopulation for whom the base-rate is very different. In the context of drug abuse research, of course, it should be pointed out that the base-rate for drug usage has been rapidly shifting in the last half-dozen years, so that while marihuana may have been a relatively improbable event and difficult to predict a decade ago, the change in base-rates has made it more amenable to the kind of research we are discussing.

Statistical Prediction is Demonstrably Superior to Clinical Prediction

For the new generation of statistically-trained researchers, this proposition must represent a truism; but the literature of one and two decades ago was quite concerned with the issue of whether prediction made by a human observer such as a clinician could exceed that of a statistical regression equation in its achieved validity. The evidence is quite unambiguous on this point; statistical prediction is the only method of choice. Of course, this is not to say that human judgment may not be essential to generating useful variables as well as quantitative scores for variables, but the job of prediction must remain a purely mathematical one.

Validities are Strongly Affected by Psychometric Properties of the Variables and the Subject Sample

Psychometric theory makes it self-evident that the measurement quality of the variables has a strong impact on actual validities obtained. For example, one easy way to increase predictive validity is to increase the reliability of variables. In addition, the subject sample is of importance insofar that restriction of range on the variables may have a disastrous impact on predictive capabilities. For example, the relationship between IQ and grades is far higher in a relatively unselected sample of grade school subjects. On the other hand, in a graduate school population that has been repeatedly sifted on the variable of IQ, with an extremely limited range of scores for IQ as well as a more limited range of scores on school performance variables, the relationship between school performance and IQ is radically decreased. This issue is of extreme importance considering the large number of surveys done on college populations that are certainly range-restricted on variables such as intelligence and probably range-restricted on other variables such as behavioral impulsiveness, distractibility, etc.

There is No Unambiguous Measure of the Importance of a Variable in Prediction

Many times we are asked to evaluate whether a given variable has more impact on a dependent variable than another. There are numerous ways to assess the importance of a variable, for example, by looking at its correlation with a criterion or by looking at its beta weight, (Darlington, 1968). The most defensible measure among multiple predictors is probably the percentage of variance accounted for in the dependent variable by the least-squares orthogonalized predictor set of variables. Obviously, even this measure is influenced by the particular set of variables included in the analysis.

Predictive Results are Typically Specific to (a) The Subjects as Sampled, (b) The Operationalization of the Variables, and (c) The Conditions of Administration and Time of Testing

The burden of proof for generalization of results beyond the specific sample, variables chosen, and method of test administration would seem to rest squarely with the investigator who claims such generalizability. It must be recognized that in general the evidence is not very optimistic regarding the transfer of results from one such situation to another.

Biased Samples of Subjects Will Not Represent the Regression Equation for the Population or for Other Random Samples

This point may be self-evident from previously mentioned principles, but it bears separate mentioning. However important a particular variable may be in a regression equation obtained for a particular nonrandom sample of subjects, one should have little hope that its weights will be useful in other populations.

Longitudinal Studies of Multiple Measures Can Require Novel Multivariate Methods of Analysis

If methods of measurement are complicated enough for the cross-sectional case, longitudinal studies pose important, challenging problems of an even more frustrating nature For example, traditional methods of factor analysis cannot be simply applied to longitudinal data. Change scores have a variety of problems of their own. The relative sequence in which techniques such as discriminant functions, multivariate analysis of variance, canonical correlation, and factor analysis are applied can affect the resultant interpretation of data. Some related issues are discussed by Bentler (1973).

Cross Validation is Required for Most Predictor-Criterion Correlations

It will be obvious that one of the major goals to be achieved by any consensus study which includes variables previously found effective in predicting current and future drug use will be the cross validation of results previously obtained only in a single sample. It is well known that results obtained in a single sample are highly unstable, in particular when results are based upon small subject sample sizes, selection of variables, and low degrees of freedom due to high redundancy among predictor variables. Clearly, no faith can be put in results that have not been appropriately cross validated. Note that we are not arguing that cross validation should replace correction for shrinkage formulas (see McNemar, 1969b).

Person Typologies Are Not Useful Unless the Variables Are Multivariate--humpy

While the goal of classifying individuals into mutually exclusive classifications or into hierarchical categories may be laudable, such a goal has particular value when the variables are not continuous and normally distributed. If the variables are close to being quantitative and the space of subjects is elliptical in nature, it is difficult to group individuals in a meaningful way according to their position in multidimensional space. It is only when there are gaps of sufficient magnitude in the space that classification and typologizing become particularly meaningful.

Modest Validity Coefficients Suffice to Select for Efficient Outcomes When the Selection Ratio is Small

It is easy to be depressed by small validity coefficients. Yet, it should be recognized that in applied situations even modest validity coefficients can generate a useful gain to the institution testing. For example, the proportion of selected applicants for a treatment program who can subsequently be judged to have passed through a program successfully may be quite high, even though the validity of the predictor for selecting the applicants is relatively modest.

The Applied Value of the Predictive Enterprise Depends on the Utilities Associated with Four Outcomes of False and Valid Prediction of Positivity and Negativity

It is quite easy to frame the tasks of the predictive enterprise simply as one of achieving high correlations between predictors and criterion variables. While such a goal is an important aspect of predictive research, ultimately the utilities associated with outcomes in applied testing situations are of crucial concern. It will probably be difficult, if not impossible, for us to take time to discuss the problems associated with evaluating utilities associated with correct and incorrect predictions. Yet, in the back of our minds we should remember that certain kinds of outcomes may be more important than others. For example, if it were established that a particular drug led to brain damage, then an intervention program aimed at keeping people from using this drug may be highly beneficial. Should one have predictors that could predict drug usage, making the prediction that a person might use the drug, when indeed he will not, might be a minor error costing only a certain amount of intervention time; but making an error omitting a prone person from a treatment program with a consequence of brain damage will be a far more damaging outcome. We may have to weigh our errors of prediction according to such dangers at some time in the future.

RESEARCH WITH INDEPENDENT DATA SOURCES

While drug use prediction-relevant research with adolescents has been increasing rapidly since the Braucht, Brakarsh, Follingstad, and Berry (1973) review (Frenkel, Robinson, & Fiman, 1974; Lawrence & Velleman, 1974; Smart & Whitehead, 1974; Victor, Grossman, & Eisenmann, 1973), research relevant to understanding the etiology of adolescent drug abuse through data sources independent of self-report has continued to be relatively rare. We have previously mentioned the use of archives that would provide independent data. These records can provide information such as school performance, and their use is quite obvious. More complex uses of independent data would deal with measures of attributes of parents or peers (which can be considered part of the social environment of an adolescent), measures of the target subject as seen by parents or peers, measures of relations among some of these persons, and measures of the environment. Apparently, no drug-predictive studies have attempted to assess the environment through the perception of parents or peers; at least, none could be located.

Attributes of parents or peers have been assessed by questionnaires and interviews. Parent variables shown to have predictive relevance to drug use are drug and alcohol use (Blum, 1972b; Kandel, 1973; Kandel, Single, Treiman, & Faust, 1974) as well as personality variables such as self-control and religiousness (Blum, 1972b). Peer variables shown to relate highly to drug use are friends' drug and alcohol use patterns (Kandel, 1973; Kandel, et al., 1974).

Although there have been impressionistic reports about a target subject by parents (Blum 1972b), there have been no systematic studies. Only the work of Smith (1969, 1973) has systematically related peer-measure variables to the attributes of a friend-subject in the context of drug research. Variables such as obedience, trustworthiness, hardworkingness, sociability, and impulsiveness (as perceived by peers) were not only shown to be significantly related to drug use patterns, but the relationships were longitudinally predictive, thus providing the first clear light on the causation problem (Smith & Fogg, 1975).

Indices of relations among parents or between parents and offspring as perceived by parents have also been shown to be related to offspring drug patterns. Again, the work of Blum (1972b) is among the earliest in the area, suggesting that looseness of family structure, permissiveness, and parental values of offspring independence and similar variables were related to drug use patterns. Related results have been carefully documented by Kandel, et al. (1974) who showed that closeness of child to parent (as perceived by the adolescent) was significantly related to drug use; whether the same relationship exists for this perception by the method-independent parent report is unclear, though the data are available.

In selecting possible variables for inclusion in future studies, one could attempt to obtain independent measures for variables that have previously been shown by self-report clinical, or other methods to have implications for parent or peer measures (Jessor, Jessor, & Finney, 1973). For example, extent of adolescent agreement or disagreement with parents on social issues was recently shown to be the major discriminator among drug using groups (Shibuya, 1974), and there is a very relevant sociological literature on self-reported delinquency containing references to drug use (Clark & Wenninger, 1962; Smith & Cartwright, 1965) and delinquent peer associations and values (Erickson & Empey, 1965; Gordon, 1967; Lerman, 1968). This work could clearly be adapted to the purposes being discussed. However, there is a big step between promising ideas in this specific area and research of proven validity, particularly because method-independent validities have been difficult to come by in the entire literature of the social sciences. On this basis, we recommend that the truly unusual and exciting works of Smith and Kandel be used as models for future research and as a source of specific items.

SUMMARY

Some metatheoretical and metaempirical issues in predictive drug abuse research are reviewed. The relation of ethics to research in this area, the importance of possible future applied uses of the research, the role of discriminant validation in prediction, and the relevance of research to public policy are considered. The criterion to be predicted is discussed in the context of decisions that need to be made with respect to its univariate or multivariate nature, the measurement of use versus abuse, the possible role of variables correlated with use, and the importance of operational definitions. Structural considerations related to the measurement of predictors are discussed as related to measures obtained by self-report, peer and parent report, behavior observation, performance testing, psychophysiological methods, archives, and sociological procedures. Principles of prediction relevant to the design of research in this area are reviewed. Finally, empirical drug research using independent peer and parent data sources is reviewed for its relevance to future predictive research.

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FOOTNOTE

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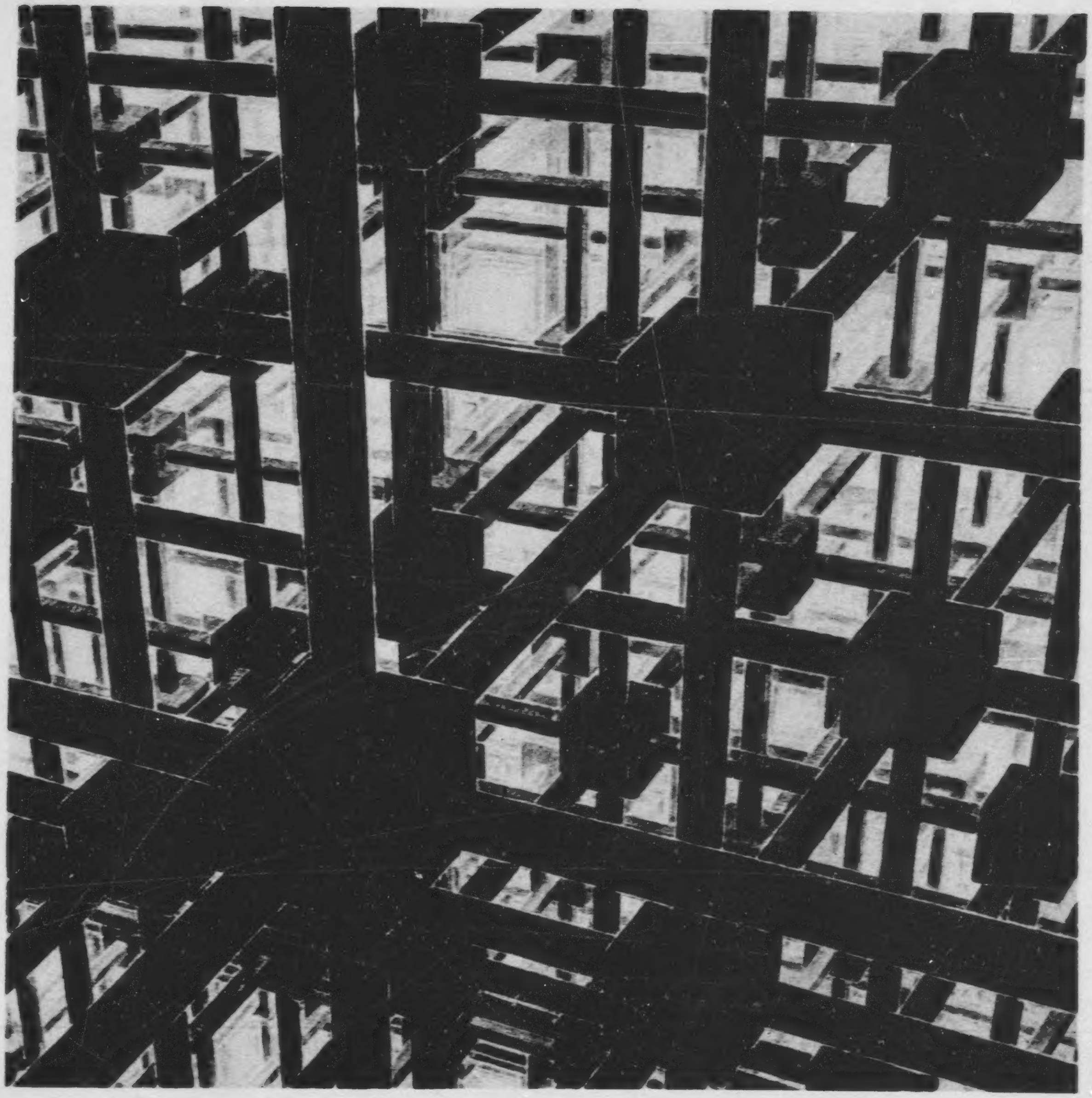

Plate 12

COMPUTER INTERVIEW QUESTIONNAIRES FOR DRUG USE/ABUSE

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INTRODUCTION

One of the basic assumptions in research is that there are important and definable correlations between drug use and life-styles. There is the further implicit expectation that by identifying these correlations and modifying drug policies we can help individual drug users and society as a whole. A major problem of research in this field is "the lack of comparability of findings across various research studies," which derives in part from "the lack of an accepted set of potentially heuristic items and variables for study" (Lettieri, 1974). This problem is shared with other mental health research areas and similar efforts have been undertaken to define pertinent variables and to inaugurate collaborative research projects (Bergin & Strupp, 1972; Wascow & Parloff, 1974; Katz, 1974).

Regardless of the content of those items that are advocated or chosen as being most useful for research in the area of drug use and life-styles, we maintain and hope to demonstrate that the method of data collection can significantly influence the reliability and validity of the responses obtained from subjects. We will present data from several different areas of research which we think show clearly that computer interview questionnaires are a preferred method for collecting this type of information.

RATIONALE FOR USE OF COMPUTER INTERVIEWS

The rationale for using a computer interview to collect information about drug use and life-styles can be summarized as follows:

ACCURATE AND CONSISTENT INFORMATION. On drug use/abuse as well as on other characteristics of drug users, accurate and consistent data is currently unavailable from any case record or resource file in the community. New programs to standardize record keeping at drug treatment centers fail to extend to the broader, nonclient population of drug users or potential users.

OTHER COMMUNITY "SOURCES." Regarding patterns of drug use among high school and middle school children, other community data "sources" are at best spotty and impressionistic. Indeed the reliability and accuracy of children's reports to these sources (school officials, teachers, youth workers, therapists, physicians, or parents) are understandably questionable and at best distorted. However, it is difficult to estimate whether these community "sources" tend to under- or overestimate the amount of drug use in the community, let alone remain objectively aware of other more "empirical" characteristics of drug users. As clinicians and researchers, we are acutely aware of the generation gap perceived by the youth culture and would be highly skeptical of the impressions of those on the "other side of the fence."

IDEAL INTERVIEW OR QUESTIONNAIRE FORMAT. Ideally, the best interview or questionnaire format is one that obtains accurate and complete information in a minimum of time.

Repetition and redundancy should be avoided. In repeated testing,situations it is essential to maintain a high level of respondent interest and cooperation to facilitate successful completion of each interview and obtain further cooperation. A skilled human interviewer attempts to tailor his/her performance to achieve these ends. The respondent's general status is quickly screened and questions in appropriate depth on specific problems are asked without overlooking important background material. Respondent motivation is enhanced by techniques for building rapport and giving the contact a personal touch. Sensitive subjects are covered by timing questions to the respondent's motivation and state and by repeating or rephrasing lines of questioning where necessary.

Trained human interviewers can do this well. Paper-and-pencil forms or standardized interviews fail in flexibility, rapport, and often relevance. One great strength of the computer is its capacity to be programmed to model the human interviewer. Branching logic enables the interview to flow naturally, concentrating on relevant questions, picking up missed information, and even tailoring future questions to the respondent's characteristics (e.g. special questions for respondents whose drug use began coincident with awareness of depressed mood). Free text response formats allow respondents to express themselves, force them to think through problems without suggesting answers, and can also provide a basis for branching. Capacities to insert names or portions of earlier free test responses can "personalize" the interview to enhance interest and motivation. Resistant, acquiescent, or other response sets can also be picked up by looking at response patterns and can then be checked out during the interview proper.

OUR EXPERIENCE WITH COMPUTER INTERVIEWS. In medical and psychiatric areas our experience with computer interviews suggests that computer reports are at least as reliable and valid as information collected by paper-and-pencil or personal contacts; and our recent work with socially deviant subjects goes even further to suggest that computers may actually be superior in sensitive areas. The more embarrassing and/or socially deviant the content of questions, the less respondents feel free to talk to a doctor. In comparing methods of interviewing, we found that the patients may feel that information about their social deviancy is important, may even want others (especially therapists) to be aware of it, but are still reluctant or embarrassed about giving the information because of concern about how the interviewer will react and fear that he may judge them. Patients describing suicidal ideas, for example, prefer the computer rather than a physician as an interviewer twice as often as individauls describing anxiety or relationship problems. Even those individuals who prefer a human interviewer complete the computer interviews and most report at the end that they find the experience interesting. Recent patient-user comments range from "it was fun," "fascinating, everybody will feel free to express their points of view," or "it's great, especially for people who find it hard to talk to others," through more neutral responses such as "fine," "I don't know," to a few moderately negative such as "impersonal tone," or "questions are awfully vague."

DIRECT QUESTIONING IN DEVELOPING PREDICTION SCALES. Because of these points we believe it is essential to rely in developing predictive scales on direct questioning of anonymous respondents, with their role defined not as patient or student but as "subject-expert" on this community problem. This approach, bolstered by appropriate incentives (either in the form of a small payment to each respondent, a lump payment to respondent groups such as school recreational associations, or possibly games that respondents can play with the computer) will insure that appropriate numbers of subjects can be interviewed within short time periods to make up cohorts necessary to answer a variety of research questions. During preliminary phases of our current project we will establish the reliability of such reports by comparing the computer interview data with information obtained by direct personal interview from a subsample of drug patients and with professional interviewers on a sample of student volunteers.

THIS COMPUTER INTERVIEW APPROACH IS ALSO JUSTIFIED ON FIVE GROUNDS:

A. Our previous work shows that the computer interview experience not only has reinforcement value for subject participation but also is an attractive, appealing method of data collection. Subjects participate, in part, to satisfy their curiosity about what the experience is like; and most find it enjoyable.

B. The computer interview is especially superior to paper-and-pencil methods for questionnaire collection. Paper-and-pencil questionnaires can readily be abandoned half-completed or be inadequately and erroneously filled out. In contrast, our computer interviews are designed and programmed so that respondents must either complete all appropriate lines of questioning or specify their desire not to respond. Options to indicate where questions are unclear or terminology is not understood are provided, and definitions of terms and rephrased questions can be presented when the subjects so indicate.

C. A third advantage of the computer interview is that as it comes in, the data is immediately stored on magnetic disk in computer-processable form. Not only does this eliminate the need for coding and keypunching input data, it also facilitates preliminary analysis. We will be able to quickly check as interviewing is proceeding the rate at which the designated cohort cells are being filled, enabling us to make necessary corrections to sample adequately within a short period of time.

D. In addition, the computer interview methodology utilized (i.e., a PDP-15-MIIS system as well as the specific interview programs) can be readily used by other investigators or at other sites. At present there are more than 30 locations in the U.S. where identical hardware/software configurations are available; and other areas can be reached by telephone, with acoustic coupler hookups. This means that the standardized interview procedure we are developing can be made available in virtually any geographical setting.

E. Finally, costs of computing equipment have steadily declined since the development of computers, and they are still going down. There presently are available in the public domain computer programs which permit construction of complex computer interviews. It is now possible to conduct interviews of the kind we are developing on our system (PDP-15-MIIS software) at a cost of 91¢ each. This includes cost of computer time 24 hours per day, computer storage, statistical analyses, terminal and phone, but assumes that interviews will be conducted only 30 hours per week. If interviewing could be extended to additional hours, the cost of each interview would be proportionately less.

Self Reports

Before describing the computer interviewing process itself, some attention to the self-report perspective is in order.

Self-reports have been used with great frequency in the growing body of therapy outcome studies, either alone or in conjunction with other measures (Meltzoff & Kornreich, 1970). In contrast to other methods such as therapist evaluations, case notes or records and psychological tests of expert evaluations, we find that patient reports have certain advantages:

1. They can be simple, descriptive, and direct; and indeed they are more reliable when they are so.

2. They require less staff time to administer and score than more complex measures.

3. Some have been standardized on large samples.

4. Respondents, whether students or patients, are often more willing than anyone else to tell about themselves. Teachers and therapists are easily bored with repetitive evaluation forms and soon respond with a casualness that can produce biased data.

Of course, there are problems with self-reports that must be recognized. They are subjective and thus open to bias. How good a judge of his own functioning is a respondent? To what extent are reports invalidated by social desirability or other response sets, by intent to manipulate, distortions from pathology, the quality of transference relationships, and so on? What is missed by taking the respondent's conscious production, overlooking deeper-level or more inferential data? Most researchers have started with the bias that experts are the most accurate judges of individual functioning because they are objective and because they are professionally trained. The assumption is also made that data reported bv expert observers is more accurate than that reported by respondents. Both assumptions are questionable. A number of studies show that patient ratings correlate well with objective observations (DeWolfe, 1968; Vingoe, 1966; Holt, 1951; Plyshyn & Agnew, 1963; Pillard, Carpenter, Atkinson & Fisher, 1966; Lanyon & Monosevitz, 1966). Those studies showing objective expert observations to be "more accurate" than those of the patients themselves have usually used the objective expert's observation or "contaminated" case notes and records as the standard of comparison. Thus, the patient can never do better than the expert observer and probably will do less well. If the patient's values or criteria were used as the standard of comparison, the expert observer would be at a similar disadvantage. Also, the data collection device itself may be so poorly designed and constructed that it causes a low level of agreement between patient and other observers.

To summarize the literature comparing self-reports with other perspectives in therapy evaluation:

A. Global, judgmental self-evaluations are more subject to bias than descriptively anchored scales (Meltzoff & Kornreich, 1970; Rogers & Dymond, 1954; Battle, Imber, Hoehn-Saric, Stone, Nash & Frank, 1966).

B. Patients can rate themselves reliably when compared with observers, diagnosticians, significant others, or therapists (Cartwright, Kirtner, & Fiske, 1963; Rogers, Gendlin, Kiesler, & Truax, 1967). Acute phases of severe disturbances may provide an exception, but patient rating increases in reliability with improvement (Prusoff, Klerman, & Paykel, 1972).

C. Therapists freqeuntly stand alone in their view of change or outcome perhaps because they use different criteria (Rogers, et al., 1967; Cartwright, et al., 1963; Yalom & Lieberman, 1971).

Similar lines of argument apply to the use of self-report techniques in drug use/abuse questionnaires.

Question Wording

In our experience patients, clients, and subjects are the best editors of questions. It is a humbling experience for an author to sit beside a subject who "misinterprets" a convoluted question written in erudite vernacular with obvious non sequiturs and incomplete response choices and then have the subject restate it unambiguously in the idiom of his peer group. Computer interviews can easily be pilot-tested, question by question, and reworded until subjects achieve an acceptable level of comprehension. Interview summaries can be evaluated or "graded" by subjects to insure that the summary contains everything they told the computer in correct form and that it does not contain answers they did not make.

It is possible that Kurt Vonnegut or John Updike would write stylistically pleasing, clear, and cogent questions for questionnaires. We confess that this has proven an arduous task for us and we depend on and gratefully accept the assistance of subject-experts who can and do tell us how to obtain information from them.

Computer Interviewing Technique

The drug questionnaire interview is similar to interviews used in other medical and psychiatric settings (Slack, Hicks, Reed & Van Cura, 1966; Grossman, Barnett, & McGuire, 1971; Greist, Van Cura & Kneppreth, 1973; Greist, Klein, & Van Cura, 1973). Subjects are directly interviewed at a computer terminal. Questions and information ("frames") are displayed on the terminal screen, and users respond to and control the interview by pressing keys on the typewriter keyboard. Branching between frames is conditioned on responses to the current and earlier frames, utilizing Boolean relationships (logical "ands" and "ors") which permit complexity rivaling that of a human interviewer. The sequence of frame presentation is exactly the same from interview to interview if the respondent chooses identical answers. Individualization of frame sequence is provided when responses are different. Thus, present smokers, nonsmokers, and past smokers might all receive different smoking sequences.

Respondents are taught how to use the interview by a computer-assisted instruction section at the beginning of the interview. This part of the program also assesses the individual's alertness, comprehension, and general mastery of the computer interviewing process before permitting him to begin the questions. The purposes of the interview and the research nature of our work are fully explained by the computer and each individual is asked whether he/she is willing to be interviewed in this fashion.

Some questions permit respondents to skip answering questions they find distasteful, though where a response is determined to be important by the program authors the program will not proceed until an answer is given. For some questions which may be unclear, respondents have the option of branching to a teaching sequence which explains the question's meaning in greater detail before again requesting their answer. Backing up to reanswer earlier frames and changing the answer to a current frame are also possible.

COMPUTER INTERVIEWING FOR SENSITIVE CONTENT AREAS

General Medical History

Since 1966, we have developed and used a series of general medical history computer interviews at the University of Wisconsin Hospital. These interviews have been refined over time in response to suggestions from patients and clinicians, but the present interview has been essentially stabilized for one year. An early version of the interview (1968) has been marketed commercially and a similar version is currently being used in several projects at the Harvard Medical School (Beth Israel Hospital). While this interview may be further refined and shortened as a result of ongoing studies, it represents in its present state a useful clinical tool which is well accepted by patients and clinicians.

Using data collected by this interview, we compared responses obtained from 50 psychiatric inpatients and 50 general medical outpatients from sections on cigarette smoking, alcohol, and marihuana use (Table 1). Both groups of patients acknowledge comparable alcohol exposure (question 1), but the psychiatric patients reportedly consumed more alcohol (data not presented) and indicated more concern and difficulty related to alcohol consumption (questions 2, 3, and 4). One general medical patient chose to skip responding to one question in the alcohol series; but all other patients, from both series, responded to all other questions presented about alcohol.

There was also a difference in acknowledgement of marihuana use (question 5). Psychiatric patients stated that they used marihuana three times more often than general medical patients stated. Only one psychiatric patient chose not to answer this screening question. In another study, Slack found that four of 32 nonpatient subjects admitted to the computer that they had "been having problems with drugs," while only two of the same subjects acknowledged having "problems" to skilled human interviewers who specifically asked about "problems" related to drug use (Slack & Slack, 1972).

Table 1

	Yes	No	Don't Know	Don't Understand	Skip It	Question Not Asked
1. "Do you drink alcoholic beverages?"						
Psychiatric Inpatients	32	17	0	0	0	1
General Medical Outpatients	33	17	0	0	0	0
2. "Do you feel you drink to excess on more than rare occasions?"						
Psychiatric Inpatients	10	22	0	0	0	18
General Medical Outpatients	3	28	1	0	1	17
3. "Has anyone ever told you that you might be drinking too much?"						
Psychiatric Inpatients	9	22	1	0	0	18
General Medical Outpatients	5	28	0	0	0	17
4. "Has drinking created difficulties for you at home, at work, with friends, or with driving your car?"						
Psychiatric Inpatients	5	2	0	0	0	43
General Medical Outpatients	1	1	0	0	0	48
5. "Do you regularly smoke marihuana or hashish?"						
Psychiatric Inpatients	9	38	0	1	1	1
General Medical Outpatients	3	46	1	0	0	0

Table 1 (cont)

Question	Yes	No	Don't Know	Don't Understand	Skip It	Question Not Asked
6. "Are you concerned that you have become dependent or are becoming dependent on drugs or that you cannot live without them?"						
Psychiatric Inpatients	6	40	3	0	0	1
General Medical Outpatients	0	50	0	0	0	0
7. "Have you ever smoked tobacco?"						
Psychiatric Inpatients	43	6	0	0	0	1
General Medical Outpatients	31	19	0	0	0	0
8. "How many cigarettes do you smoke in one day?" (for present smokers)	< 1/2 pack	1/2-1 pack	1-2 packs	> 2 packs	Skip It	Question Not Asked
Psychiatric Inpatients	4	15	11	4	0	16
General Medical Outpatients	9	6	3	0	0	32

More psychiatric patients than general medical patients had smoked, and they acknowledged smoking larger quantities of cigarettes (questions 7 and 8).

We analyzed the interview format preferences of the respondents who used alcohol, marihuana, or cigarettes (Table 2). While it is difficult to draw firm conclusions in some instances because of the small numbers in some cells (notably with marihuana), it is clear that both groups of patients strongly preferred the computer over paper-and-pencil questionnaires (21 versus 3 for alcohol, 5 versus 1 for marihuana, and 24 versus 5 for cigarettes). Also, it was apparent that: (1) psychiatric patients who might be expected to have greater difficulty because of drugs reported higher rates of drug use and/or greater difficulty associated with that use; (2) both groups acknowledged some drug use and problems associated with it; (3) these individuals seldom chose not to answer questions (two times out of 535 options, 0.37%) though that option was always available; and (4) those individuals who used cigarettes, alcohol, or marihuana and had a clear preference for interview modality selected the computer over all other choices, especially paper-and-pencil forms.

Venereal Disease

A computer interview to obtain medical history from persons concerned about venereal disease (VD) and a venereal disease teaching program were tested in a venereal disease clinic in Madison, Wisconsin (Van Cura, Jensen, Greist, & Lewis, 1974). Forty-six individuals completed the history portion of the questionnaire. All respondents gave permission for their responses (nonanonymous) to be used for research purposes, and 61% of the individuals completing this portion of the interview expressed a preference for giving personal information directly to the computer rather than to a physician.

When information gathered by the computer interview was compared with those collected independently by the clinical staff and recorded in the medical record, there was agreement in 39 out of 46 cases. In five instances the computer and clinical records were in disagreement, and in two the record was lost. In two cases of disagreement the record indicated "girl friend with vaginal infection" and "swelling at the base of penis," questions the computer had not been programmed to ask. In three other instances, there was a discrepancy in descriptions of similar phenomena as listed below:

	MEDICAL RECORD	COMPUTER
a)	HOMOSEXUAL	ENGAGED IN ORAL AND ANAL SEX
b)	CONTACT WITH PROVEN POSITIVE	DID NOT KNOW IF CONTACT WAS POSITIVE
c)	YELLOW DISCHARGE	WHITE DISCHARGE

Four symptoms collected by the computer interview proved to be predictive of gonorrhea: (1) discharge, (2) dysuria, (3) multiple contacts, and (4) positive contact. The presence of one or more of these symptoms meant a given individual was likely to have gonorrhea, as confirmed by positive culture results. These indices held up in a replication using medical records of clinic patients. In 102 cases where sufficient information was recorded to determine the presence or absence of these four factors, there was no occasion where all four risk factors were negative and the person was found to have gonorrhea by appropriate culture studies.

Psychiatric - Emotional Problems

In our work with psychiatric patients we have developed a computer interview to describe the patient's symptoms and problems at the beginning of treatment (Greist, Klein, & Van Cura, 1973). In the first section of the interview the patient is asked to describe in his own words "your most serious problem or difficulty;" to elaborate in terms of the effect on "your life and activities;" to tell how he or she acts when the problem is "at its worst;" and how things would be different if the problem were to be solved. Four

Table 2

Interviewee Preference

		Physician	Registered Nurse	Paper and-Pencil	Computer Interview	No Difference	Total
Alcohol	Psychiatric Inpatients	7	2	3	10	10	32
	General Medical Outpatients	6	1	0	11	15	33
Marihuana	Psychiatric Inpatients	2	0	1	2	4	9
	General Medical Outpatients	0	0	0	3	0	3
Cigarettes	Psychiatric Inpatients	9	2	5	12	15	43
	General Medical Outpatients	4	1	0	12	14	31

frames are available for the patient to type out the problem, followed by two frames for standardized ratings of the frequency (from "not at all" to "all the time") and intensity (on a nine-point scale from best to worst). After the initial question the patient is asked to list a second and third problem where relevant. The interview then moves to questions drawn from the Hopkins Symptom Checklist, a scale of common neurotic symptom clusters. Additional questions at the end of the interview check for further problems and missed information.

This interview has been given to more than 300 patients in our outpatient, partial care, and inpatient settings and to some patients over as many as four occasions to reflect change. A vast array of problems is described, some in great detail, others more tersely. To provide an example of the kinds of responses these questions elicit, we will quote first a psychiatric outpatient describing a marital problem and then a psychiatric inpatient describing depression.

The outpatient, a married male, stated that his first problem was "working out a day-to-day way of living with my wife that doesn't cause us so much anxiety." At its worst, he states "I feel quite anxious. I try to find out how she is feeling toward me. This sometimes results in a quarrel. Usually I resolve it by doing what I think will (please her)." If the problem were to be solved he "imagine(s) that I would feel more free and less anxious." Summing up the effect of the problem on his life and activities he states "it makes me feel afraid and guilty and to worry too much about the effect on her of everything I do."

The depressed inpatient, a female, describes her problem as: "I feel depressed all the time. I can't really describe it, but (at its worst) I pace the floor and cry a lot. I can't sleep. I just feel sick all over." If the problem were to be solved she "would be able to do my duties as I should. I would be normal instead of how I am now." The problem's effect on her life is that "I am not able to keep up with my housework. I am not able to function in my role as a housewife and mother."

The distribution of problem areas for 128 such problems examined is similar to that found in other research (Kiresuk & Sherman, 1968). The most frequent complaints have to do with relationships (27%). Next come identity problems (14%), depression (13%), low self-esteem (11%), and physical problems (11%). More pertinent to interviewing for socially deviant behavior such as drug abuse are instances where problems with anger (5%), drugs and alcohol (5%), and sex (3%) are described. Not only the fact of sexual problems, extramarital affairs, and abuse of alcohol or drugs are mentioned in target problems obtained by computer interview, but many details are also given. To mention a few responses in these areas:

> *I like to get polluted - I have a fear of alcoholism - I drink when I am bored and drink if sexually frustrated.*
>
> *My problem is "ejaculatory incompetence."*
>
> *I steal things a lot.*
>
> *I feel like killing my parents and girlfriend. I think of people being butchered in wars and killing everyone like my cat.*
>
> *I am getting heavily into drugs again.*
>
> *I feel like overdosing or getting on dope again.*
>
> *My problem was drinking and chasing after other women. I had an affair.*
>
> *My problem is use of alcohol in dealing with problems stemming from sexual problems. I can't function sexually without alcohol and I drink way too much.*

I have taken overdoses of pills and carved on my arm and lied to myself and everyone else for years.

In another study we compared the computer method for eliciting target complaints with paper-and-pencil and personal interview methods. Virtually the same number of target complaints were given under each condition (all gave one problem; 26 percent, 2; 9 percent, 3), and the number of phrases in each complaint did not differ substantially over the three methods. When complaints were rated blind by two judges on a five-point scale of completeness, some method differences arose. When the computer interview followed the paper-and-pencil form, it elicited a more complete symptom description in 75% of the cases. The reverse was true when paper-and-pencil and personal interviews were compared: the personal interview elicited more complete complaints only when it came first (in 83% of the cases). Finally, when compared for thematic consistency (whether themes mentioned under one method reappeared under the other method) the computer was more consistent than the personal interview, especially when the computer interview was given second.

These findings support the reliability of the computer interview when contrasted with other data collection forms. Although our work has made it clear that psychiatric patients will give complete and accurate pictures of their symptoms by computer interview methods, the fact remains that they are a motivated group, operating under the implicit set of seeking help for specific problems, with covert and overt pressures for self-revelation and honesty. It is another question altogether whether nonpatients, those who are not seeking help for problems, will be as candid.

Deviant or Intimate Behavior

We have investigated directly the issues concerning personally-sensitive or socially-deviant behaviors in a series of interviews given to nonpsychiatric patient subjects. Respondents drawn from medical clinic patients, their relatives, and hospital staff were asked to take either a computer interview or a paper-and-pencil questionnaire, with questions in nine areas chosen to represent a range of deviancy of content. Less deviant questions were about flu, chickenpox, and chest pain. Moving toward more sensitive and/or deviant areas were questions about premarital sex, venereal disease, masturbation, homosexuality, suicide, and murder. Questions in each of these nine areas were written by five different staff members, covering possible causes of chest pain, the hesitancy of flu victims to seek medical help, whether suicide had ever been attempted or murder seriously considered. Sex questions focused on VD, homosexual feelings, the quality of childhood knowledge of masturbation, and guilt associated with premarital heterosexual relationships. After responding to the direct questions in each area, respondents were asked to rate their preference for giving this type of information to a computer (or in paper-and-pencil form if they had that method), to their regular physician, and a new physician.

The results that follow are from computer interviews with 50 respondents compared with 50 other paper-and-pencil questionnaire responses, all randomly selected. People seem to tell more to the computer than on paper-and-pencil forms. About 25% of the computer interview sample said "yes" or "maybe" to the question about homosexual desires, and about 15% admitted murderous wishes. These rates can be compared with 8% for homosexuality and 6% for murderous wishes in the paper-and-pencil questionnaire sample, indicating greater openness with the computer. (This difference only approaches significance at the 10% level; Chi-square 4.497, $p < .10$). With respect to guilt over premarital sex, the same tendency was observed: a somewhat higher percentage of the computer respondents admitted guilt over premarital sex (35% versus 22% for the paper-and-pencil questionnaire). There was no difference between the computer and paper-and-pencil results for suicide, venereal disease, and masturbation, possibly because there was a very low overall rate of admission of problems in these areas.

It is also informative to look at responses to evaluation and modality preference questions in the computer and paper-and-pencil groups. While outright preferences for computer interviews over physician interviews (note that computer and paper-and-pencil preferences were not directly compared) are relatively low (highest being 22% for homosexual questions), many respondents indicated no difference in their preference for computer versus either the regular physician or the new physician. More thorough analysis of the pattern of these preferences, broken down by specific question, is revealing. In general we found the following:

1. A "regular doctor" was preferred somewhat over the computer for chest pain, flu, veneral disease, and suicide questions.

2. The more deviant the questions (especially for sexual questions), the less both the regular and the new physician were preferred in contrast to the computer or "no difference." For homosexuality, masturbation, and premarital sex especially, more respondents saw no difference between physician and computer for information gathering.

3. The more experience the respondents had with the computer interview (the further through it they were), the less they indicated a physician preference and the more they chose "no difference."

Because this study covered nine different content areas and had only two questions in each area, it was impossible to develop lines of questioning that were very comprehensive or probing. In order to do this, we are currently conducting a second study in which respondents are interviewed about two areas chosen because they are personal, intimate, and where most people might experience some concern or difficulty.

The first, regarding level of exercise and general physical conditioning, is covered by a series of questions about physical exertion at work and in leisure time activities. There follow, expecially in those who do little exercise, questions about concerns in this area of functioning.

The second area has to do with sexual performance. Early questions establish sexual frequency and ask for details of sexual performance, including orgasmic frequency and enjoyment. Subsequent questions cover sexual hangups or problems (including problems with the sexual partner) or difficulties communicating with the partner about sexual preferences and desires, masturbation, and sexual history. In this study the computer interview is compared with a personal interview, conducted by trained psychiatric residents. Respondents are assigned randomly to the two groups. With just 12 physician and 12 computer interviews completed at this time, we can report only very preliminary results; but the following points are of interest. Some kinds of problems may be easier to tell to the computer: female respondents admit to more dissatisfaction with sex and reveal a lower rate of orgasm when they are interviewed by the computer than when they are interviewed even by a same-sex physician. Also, a higher percentage of both males and females responded "yes" or "maybe" to the question "Do you have any sexual hangups?" in the computer condition (50%) than in the physician condition, where almost all responded "no." Finally, there was a slight trend for more respondents of both sexes to admit to current self-masturbation in the computer condition.

When asked about their preference for computer versus physician interviews, we found that females quite consistently preferred the method they received (for both question areas). Males were split 50:50 in both computer and physician conditions for questions about exercise, but 75% selected the computer and 25% said "no difference" when they had just been asked sex questions by the computer. In contrast, when interviewed by the physician 100 % indicated no difference (i.e., none said that they preferred the physician). This latter result may be a function of the fact that most of the human interviews completed to date were with female interviewers (psychiatry residents).

OTHER ISSUES

Subjective Data Base

While we await the results of our empirical studies to select items that will predict drug use, we are faced now with the problem of choosing likely items and lines of questioning for these studies. Some items with significant predictive potential have begun to emerge from on-going research, but many results have not proved as powerful as hoped.

In the analogous area of medical and psychiatric prediction (e.g., where we are predicting present states or conditions, i.e., diagnosis, or future outcomes, i.e., prognosis) few successful predictive programs have been developed because the data bases used for such decision-making have been both expensive to obtain and of poor quality. Medical records are notoriously poor sources of information on patients. Information is frequently absent, incomplete, illegible, or inaccurate.

An alternative is a data collection system (as through the use of computer interviews) that provides a large enough data base to test and develop predictive equations. Because of the amount of time required to construct such a data base and because the importance of any piece of information may vary from time to time, depending on the populations studied, these data bases are in danger of becoming obsolete by the time they are developed.

A neglected source of information that can be tapped is the clinician. Stored piecemeal in his/her mind are facts and ideas developed during years of training and experience; properly elicited, this background can be reformulated in the form of simple and testable hypotheses or predictive statements. Thus the clinician's weakness, a limited ability to process this data, can be readily remedied with the help of any one of several computer processing algorithms (Bayes Theorem, cluster analysis, decision trees, and so forth).

While it is unlikely that any single clinician possesses the experience needed to provide this data on his/her own, a structured interaction between several clinicians may come close to that goal. Unfortunately, such interactions are frequently slow and frustrating. Methodologies have been developed and tested which permit groups of clinicians to estimate quantification of relations between symptom and disease at the rate of nearly 50 per hour (Gustafson, Shukla, Delbecq, & Walster, 1973; Stauss, Gustafson, & Ludke, 1975).

These different methodologies[1] were combined for the first time in an attempt to develop a computer-aided diagnostic system for the area of thyroid disease. Bayes Theorem was chosen as the processing mechanism. The performance of the diagnostic system using quantifications of physician judgments was compared against a Bayesian model using a data base collected prospectively over a five-year period. The results indicated that the "subjective diagnostic model" performed at least as well according to all measures of effectiveness and seemed to cost much less to develop (Gustafson, Kestly, Greist, & Jensen, 1971; Gustafson, Kestly, Ludke, & Larson, 1973).

However, this test was not conclusive because the system was developed in an area where physicians already do a good job of diagnosis, so there was little demand for the product. Suicide was chosen as the topic for a full-scale pilot study because a successful suicide risk predictor would be clinically useful.

In a retrospective study, the suicide risk prediction program utilizing a subjective data base successfully predicted 70% of the suicide attempts, while 20 clinicians as a group predicted only 40% of suicide attempts and none of the clinicians performed as well as the computer (Greist, Gustafson, Stauss, Rowse, Laughren, & Chiles, 1973).

It seems probable that techniques such as those we have employed in the areas of thyroid disease and suicide risk prediction would also be useful over the short term in developing predictive instruments for drug use and abuse.

Informed Consent

Individuals participating in research have a right to be informed about the nature and purposes of the research, possible risks and benefits, the uses of data obtained from and about them,alternative forms of treatment available when this is appropriate, and procedures by which they may terminate their participation in the research. When minors are involved, parental consent must also be obtained.

The choice of method for obtaining parental consent has important sampling implications. Written dissent is less costly and most likely to yield a larger sample by eliminating only those who specifically object to the research. Written consent will probably yield a smaller sample, perhaps weighted with socially responsible parents and underrepresentative of the more disinterested, passive, or negative types.

There is no question that parents and their children who are to be interviewed should be free to refrain from participating in any kind of research. We feel that a written dissent procedure for the parents and a carefully articulated positive consent procedure for child respondents at the beginning of the computer questionnaire provides ample opportunity for expression of subject wishes without handicapping researchers to the point that their research findings are invalidated by serious sample bias. In any sampling procedure it is essential to try to identify demographic characteristics of nonrespondents.

SUMMARY

With the advent of high speed digital computers, and the development of time-sharing systems and interview construction and conduction programs, it became possible to collect information directly from subject respondents by computer interview. Computing costs have steadily decreased and have now reached a point where computer interviews are economically feasible for routine clinical and research applications.

Interviews of patients have demonstrated several advantages of computer interviews over other interviewers. Data collected are complete, standardized, legible, accurate, and immediately stored in computer processable form. Patient acceptance of the technique has been strongly positive. Patients particularly prefer computer interviews to paper-and-pencil questionnaires.

Nonpatients also respond favorably to the technique as an information gatherer and tend to prefer the computer more as the subject matter becomes more sensitive. Suicidal, murderous, and sexual feelings and functioning are areas where the computer interview does well. Few questions about drug use have been tested, but responses to date suggest that this area is also one where the computer interview may have an advantage over other interview modalities.

Regardless of the content of items chosen to assess drug use/abuse and life-styles, the method of data collection can significantly influence the reliability and validity of the responses obtained. Computer interview questionnaires have several potential advantages for drug use/abuse/life-styles subject matter, and this paper reviews data supporting this position. With various socially deviant topics including drug use, most subjects preferred computer to physician interviews and especially favored them over paper-and-pencil questionnaires. Data obtained are at least as valid and reliable as that collected by humans and have had predictive utility. Statistical analyses are facilitated and human data transformations eliminated because data are immediately stored in computer processable form.

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FOOTNOTES

[1] For a detailed description of the several methodologies used to develop the subjective data base, see references Van de Ven and Delbecq, 1971; Gustafson, Kestly, Ludke et. al., 1973; Gustafson, Shukla, et al., 1973; Stauss et al., 1975.

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PERSONALITY FACTORS RELATED TO DRUG AND ALCOHOL USE

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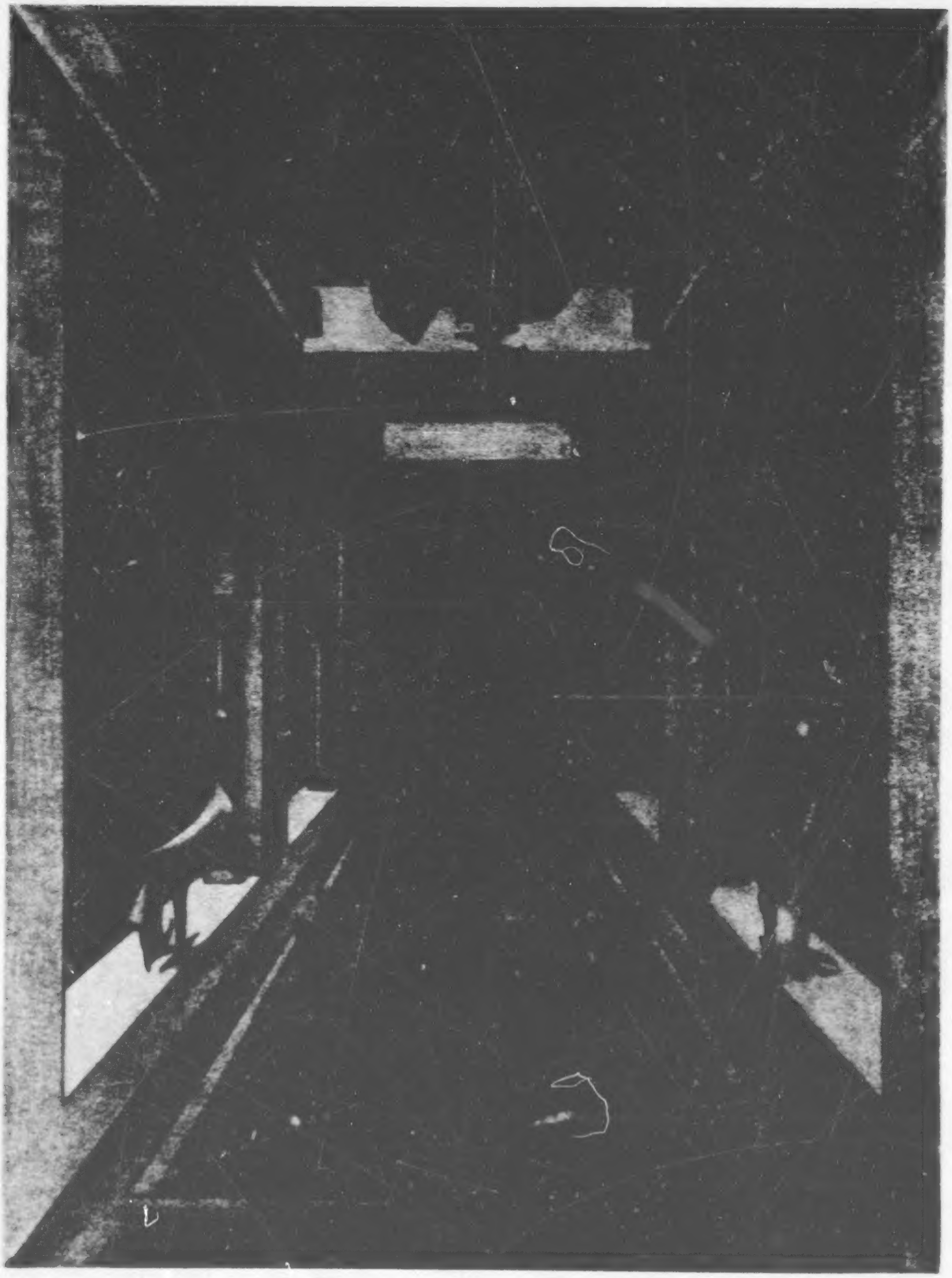

Plate 13

PERSONALITY FACTORS RELATED TO DRUG AND ALCOHOL USE

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The research described herein is part of an extensive ongoing series of studies exploring the relationship between personality and environmental variables which are related to drug and/or alcohol use or nonuse in young adults. The findings are presented in two sections. The first section represents findings from an exploration of the pattern of inner experiences (daydreaming and imagery processes) as they relate to drug use, to general personality characteristics such as self-reported needs of individuals, and to dimensions such as conforming to peer pressure and the degree to which persons seek exciting or stimulating experiences. The role of sex differences in fantasy patterns in relation to drug and alcohol use was also of interest. The second section presents part of the results of a series of systematic discrimination studies which utilized a wide range of personality and imaginal process variables to discriminate between drug users and nonusers.

PART I

DAYDREAMING, IMAGERY, PERSONALITY, AND DRUG OR ALCOHOL USE OR NONUSE

If daydreaming and imagery processes are viewed as having emerged in part from one's early social experiences and as being an aspect of the inner experiences of a person, then these daydreaming and fantasy processes can be viewed as an integral part of one's total personality. Daydreaming or fantasy processes, then, may be interpreted as a kind of internal stimulus field capable of evoking positive and negative aspects and of generally serving, for at least some persons, as an alternative form of behavior to overt action. Therefore, it is possible to hypothesize that different patterns of daydreaming may lead to specific predilections for drug use. Segal and Feger (1973), for example, have demonstrated a relationship between imagery processes and drug use. College students who used drugs were found to be more receptive to fantasy, to experience a greater intensity of fantasy compared to nonusers, and to be oriented toward seeking new experiences. Segal and Feger concluded that drug use may serve to stimulate specific kinds of fantasies and that the need for these fantasies may be related to basic personality characteristics. Thus, this phase of the study represented an effort to explore the relationship between drug or alcohol use or nonuse, imagery processes, and personality variables.

The objective involved in this part of the study was to examine the factorial structure of a series of personality and daydreaming scales in relation to reports of drug and alcohol use from two rather different college samples, representing a midsouthern, rural-oriented college sample and a northeastern, more representative nationwide college sample. The choice of a midsouthern college represented an effort to examine a group that has grown up in an area in which not only is drug use illegal and disapproved of but sale of alcohol in many areas is still illegal. The contrast between the more urbanized northeastern student and the more rural-oriented midsouthern college student might reveal more clearly particular patterns linked to drug or alcohol use in a setting where there is less likelihood of broad social support or general social acceptance of drug and alcohol use.

While studies of the type pursued herein of necessity are exploratory because of the paucity of previous research in this area, some tentative hypotheses can be advanced. Research on drug users (Segal & Merenda, in press; Victor, Grossman, & Eisenman, 1973; Zuckerman, Neary, & Brustman ,1970) has suggested that there is often a combination of denial of achievement or conformity, a press toward independence or autonomy, and an orientation toward thrill or sensation-seeking behavior. Therefore, it might be expected that loadings for the use of hard drugs ought to come on the same factor which shows a) loadings for various sensation-seeking variables and for external expectation of reinforcement, and b) indications of low emphasis on achievement and high emphasis on autonomy as reported on Jackson's Personality Research Form, a measure which presents a series of scales designed to tap Henry A. Murray's list of needs. To the extent that drug use is seen as enhancing fantasy capacities and enriching inner life, it might also be expected that there will be a negative correlation between some of the daydream factors and drug use.

With respect to the sociocultural differences reflected in the two samples, it might be expected that the use of hard drugs and the use of marihuana might have differential implications for subjects from the two contrasting institutions. Marihuana use is increasingly accepted on college campuses and appears to be used in moderation much as beer has always been. This circumstance would certainly appear to be less likely for the midsouthern college sample because of the strong religious orientation which prevails in the region and also because of the general characteristics of the student body. One might therefore anticipate greater similarity on various personality characteristics of marihuana and hard drug users between the midsouthern college students and the northeastern college students, who represent a more urban student population.

An interesting possibility presents itself with respect to alcohol use as contrasted to drug use. It would appear that a guilt-ridden or hostile/aggressive daydreaming style might more likely be associated with alcohol use than with drug use. It is possible that subjects who use alcohol but no drugs are likely to be persons seeking disinhibitory experiences or experiences that will permit reductions of superego concerns, choosing alcohol in contrast to drugs which, by popular report, enhance self-awareness and self-consciousness. Consequently, there should be at least some loading for alcohol-only use on the same factor on which there is loading for both guilt and hostile daydreaming content.

In summary, the study described presents the results of a factor analysis of a group of daydreaming scales (the Imaginal Processes Inventory), a personality inventory (Personality Research Form), a measure of internal-external reinforcement (Rotter's I-E Scale), a measure of sensation-seeking (Zuckerman's SSS), and a series of ratings of subjects with respect to hard drug (heroin, amphetamines, LSD, and cocaine) use and/or marihuana and use of alcohol only. The sample included male and female students from a midsouthern university, which draws students predominately from midwestern and midsouthern rural areas, and from a northeastern university, which draws students from many northeastern urban or suburban dwelling centers.

Subjects

The subjects were predominately freshmen students who volunteered to participate in a large-scale testing session with the understanding that they would also have the option of continuing to participate during the year in various substudies, with the likelihood that they could be paid for such further participation. Because of the different natures of the institutions, somewhat different methods had to be used to solicit subjects; however, since a large proportion of entering students of both institutions were obtained relatively easily, there was no reason to assume any systematic difference in the sample. Students were guaranteed anonymity and provided with detailed consent forms at the time they agreed to participate. Anonymity was ensured by the use of code numbers and self-selected code names. At no time were the experimenters familiar with the actual names of the subjects in the study.

The subjects were drawn from two rather contrasting institutions, Yale University and Murray State University (MSU). Yale, as an Ivy League school in the northeast, draws a reasonably national freshman group with a fairly equal balance of Protestant, Catholic, and Jewish students who are predominately white. MSU draws students primarily from Kentucky and from the states immediately adjacent to it, Tennessee and southeastern Missouri. Almost all MSU students are white, most come from rural or semi-rural backgrounds. The predominant religious orientation is Protestant, largely of Baptist denomination;

few Catholic or Black subjects were included in the sample. MSU is located in a county which bans the public sale of liquor and in which there is fairly stringent enforcement of laws on drugs. This setting is a sharp contrast to the atmosphere at Yale where, typically, cocktails will be served to students in their residential colleges. The total of subjects for this study was 579, with 117 males and 68 females from Yale and 146 males and 248 females from MSU.

Administration of Tests

A battery of inventories was administered to subjects at one extended period, with large groups filling out the questionnaires together. Opportunities for rest and refreshment were provided during intermissions. The subjects were subsequently given opportunities to ask questions about the nature of the measures. It was also made clear that a number of students might be selected by random methods for further studies later in the semester, for which they would be paid.

Instruments

IMAGINAL PROCESS INVENTORY (IPI) (Singer & Antrobus, 1972). The IPI consists of 28 subscales, of which 22 are designed to assess the content of the structure of daydreaming and the remaining 6 represent measures of curiosity and patterns of attention. Each subscale yields a score representing the degree to which specific daydream or fantasy content is present. The 344 items which comprise the various subscales are randomized and distributed within the inventory. The 28 subscales are:

Scale 1: Daydreaming Frequency
Scale 2: Night Dreaming Frequency
Scale 3: Absorption in Daydreaming
Scale 4: Acceptance of Daydreaming
Scale 5: Positive Reactions in Daydreaming
Scale 6: Frightened Reactions to Daydreaming
Scale 7: Visual Imagery in Daydreams
Scale 8: Auditory Images in Daydreams
Scale 9: Problem Solving Daydreams
Scale 10: Present-Oriented Daydreams
Scale 11: Future in Daydreams
Scale 12: Past in Daydreams
Scale 13: Bizarre/Improbable Daydreams
Scale 14: Mind Wandering
Scale 15: Achievement-Oriented Daydreams
Scale 16: Hallucinatory Vividness of Daydreams
Scale 17: Fear of Failure Daydreams
Scale 18: Hostile Daydreams
Scale 19: Sexual Daydreams
Scale 20: Heroic Daydreams
Scale 21: Guilt Daydreams
Scale 22: Curiosity: Interpersonal
Scale 23: Curiosity: Impersonal
Scale 24: Boredom
Scale 25: Mentation Rate
Scale 26: Distractibility
Scale 27: Need for External Stimulation
Scale 28: Self-Revelation Scale

PERSONALITY RESEARCH FORM (PRF) (Jackson, 1965, Form A). The PRF yields a set of scores for personality traits "broadly relevant to the functioning of individuals in a wide variety of situations" (Jackson, 1965, p. 4). The scale focuses primarily on normal rather than abnormal behavior and presents a comprehensive description of personality based on H. A. Murray's categories of basic motives or needs. The fifteen subscales of Form A are as follows:

1. Achievement
2. Affiliation
3. Aggression
4. Autonomy
5. Dominance
6. Endurance
7. Exhibitionism
8. Harm Avoidance
9. Impulsivity
10. Nurturance
11. Order
12. Play
13. Social Recognition
14. Understanding
15. Infrequency

LOCUS OF CONTROL (Rotter, 1966). Rotter's Locus of Control (I-E) Scale is comprised of 29 items (23 keyed, 6 fillers) presented in a forced-choice format. The scale assesses the degree to which individuals believe that reinforcements for one's behavior are contingent upon personal action or are a function of elements "outside" oneself. High scores represent beliefs that reinforcements are a function of elements "outside" oneself.

SENSATION SEEKING SCALE (SSS) (Zuckerman, Kolin, Price & Zoob, 1964, Form IV). The SSS, which contains 72 forced-choice items, consists of five factor scores, each score representing a specific dimension of sensation seeking. This set of scales attempts to differentiate between ways in which individuals actively seek out stimulation from the environment, as follows:

I. General Sensation Seeking, which represents a preference for impulsive, stimulating and exciting situations

II. Thrill and Adventure Seeking, which consists of items reflecting situations containing elements of speed and danger

III. Experience Seeking, which is representative of items indicating "a need for broad variety of experiences achieved through travel, drugs, music, art, and an unconventional style of life" [Zuckerman, et al., 1972, p. 307]

IV. Disinhibition, which is closely associated with items reflecting a hedonistic, extroverted philosophy involving drinking and a need for social contact

V. Boredom Susceptibility, for males only, which contains items indicating a dislike of repetition, routine, and dull situations or people and a preference for change and exciting people. Since this item is for males only, it was not included in all of the analyses in order to facilitate comparison of sex differences.

ALCOHOL-DRUG RESEARCH SURVEY. This instrument was developed as a means of generating extensive detail on the varieties of drug and alcohol usage by subjects together with demographic information. It calls for self-ratings on the extent, duration and frequency of use of a variety of drugs and alcoholic beverages. For purposes of statistical analysis, items which indicated the use or nonuse of alcohol and/or drugs were assigned scores representing the extent of such use or nonuse, and these scores were included as variables in the factor analysis.

Statistical Analysis

Iterative factor analyses were conducted on the IPI, PRF, I-E, SSS, and specific items on the Alcohol-Drug Use Survey. The finding to be presented herein represents the results from a grand factor analysis in which sex, college, and drug-alcohol use scores were included as variables. In this analysis the initial communalities were the highest absolute raw correlations. Factorial solutions were obtained by using a normalized varimax rotation procedure.

RESULTS

An orthogonal varimax rotation for the total sample yielded a 5-factor solution accounting for 73% of the variance with rapid reductions in cumulative variance for subsequent factors. Thus, the factors presented here represent what appears to be the best psychological solution to the matrix. Table 1 presents the major variables loading on each of the five factors, with tentative titles for the factors.

Factor I apparently represents a general propensity to use drugs. There is an impressively high degree of association between the usage of five drugs: hallucinogens, barbiturates, methamphetamines, marihuana, and amphetamines. Interestingly, use of marihuana alone correlates inversely with this factor, suggesting that this factor basically represents a hard drug use orientation and that the marihuana-only user may be qualitatively different from the multiple drug user. The loading of the experience seeking scale of the SSS indicates that the use of hard drugs is associated with a need for a broad variety of experiences achieved through unconventional behaviors. Interestingly, Zuckerman, Bone, Neary, Mangelsdorff & Brustman (1972) note that experience seeking represents a need to heighten inner experiences through exotic or unconventional acts. Thus, as represented in the constellation of loadings on Factor I, emphasis on multiple drug use is apparently related to achieving a heightened state of inner awareness by means of reacting to chemical stimulation. Thus, we have what appears to be a striving for new experiences through external stimulation. The failure of any other personality measure or daydreaming scale to load significantly on this factor suggests that drugs may be used primarily for their stimulating effects.

The second factor tends to resemble the guilt-dysphoric factor obtained by Singer and Antrobus (1972) in their work with the IPI. This factor essentially represents considerable concern with inner experiences, particularly related to guilty and aggressive fantasy content. Interestingly, no loading for drug or alcohol use is evident on this factor.

Factor III, which might be labeled Marihuana and Sensation Seeking, shows loadings for the four SSS scales used in the study (Experience Seeking, General Sensation Seeking, Thrill and Adventure Seeking, and Disinhibition), use of marihuana only, and several PRF subscales. The general patterning of loadings on the factor suggests that subjects who score high on it tend to be high sensation seekers, to show a determination to be autonomous and independent, to be somewhat nonconforming, and to use marihuana only. This factor indicates clearly that use of marihuana is not only associated with a strong need for external stimulation, but it is also related to important personality variables such as little need for structure, social recognition, and nurturance. This factor presents an interesting contrast to Factor I, in which use of marihuana only loaded inversely in relation to hard drug usage. Thus, while marihuana is also apparently related to external sources of stimulation, its use apparently is not strongly associated with multiple drug use and therefore may represent two different levels or degrees of stimulus seeking or means of obtaining gratification.

The remaining two factors have heavy IPI and PRF loadings, and do not show any appreciable drug or alcohol use loadings.

Examining factor analyses carried out separately for each college did not contribute further to the information already elicited through the general factor analysis. For example, for the Yale sample the factor analysis yielded six factors which included the five already described and to which was added another factor which had a relatively heavy loading for women and, hence, might be called Psychological Femininity. This factor has its highest loadings on Affiliation and Nurturance and negative loadings on Autonomy. The addition of this factor suggests that within the Yale group women are still more likely to show many of the traditional female traits such as affiliativeness, lack of autonomy, a need for nurturance, a need for play and social recognition, and a perception

TABLE 1

Results of Factor Analysis for Combined MSU and Yale Samples

Factor 1

(Tentative Title: Hard Drug Use)

Variable	Loading
Hallucinogens	.83
Barbiturates	.82
Methamphetamines	.82
Marihuana	.78
Amphetamines	.73
Cocaine	.68
Other Drugs	.65
Heroin	.64
Experience Seeking (SSS)	.33
Marihuana only	- .32

Factor 2

(Tentative Title: Guilt-Dysphoric Daydreaming)

Variable	Loading
Guilt daydreams	.77
Hostile daydreams	.74
Fear of failure daydreams	.72
Heroic daydreams	.70
Hallucinatory-vividness of daydreams	.60
Achievement-oriented daydreams	.57
Frightened reactions in daydreams	.56
Bizarre improbable daydreams	.34
Auditory imagery in daydreams	.33
Disinhibition (SSS)	.32

Factor 3

(Tentative Title: Marihuana use-Sensation seeking)

Variable	Loading
Experience seeking (SSS)	.73
General SSS	.73
Harm avoidance	- .61
Marihuana-only use	.58
Thrill and adventure seeking	.57
Autonomy	.55
Disinhibition (SSS)	.43
Order	- .39
Social recognition	- .36
Nurturance	- .31
Impulsivity	.31

TABLE 1 (cont.)

Factor 4

(Tentative Title: Positive/vivid daydreaming)

Variable	Loading
Absorption in daydreaming	.64
Positive reactions in daydreaming	.64
Visual imagery in daydreams	.59
Auditory imagery in daydreams	.55
Acceptance of daydreaming	.54
Future in daydreams	.50
Mentation rate	.45
Problem solving daydreams	.45
Daydream frequency	.43
Sexual daydreams	.43
Self-revelation	.41
Nigh dreaming frequency	.38
Exhibition	.35
Need for external stimulation	.34
Frightened reactions in daydreams	.33
Mind wandering	.32
Hallucinatory vividness of daydreams	.31

Factor 5

(Tentative Title: Anxious/Distractible Daydreaming: Neurasthenia)

Variable	Loading
Achievement	- .69
Endurance	- .69
Mind wandering	.67
Boredom	.67
Distractibility	.52
Dominance	- .44
Daydreaming frequency	.42
Understanding	- .40
Locus of control	.38
Absorption in daydreaming	.37
Impulsivity	.37
Play	.30

of themselves as more controlled by external events (Rotter's I-E). Women's scores also showed negative correlations with Thrill and Adventure Seeking and Experience and Sensation Seeking.

The separate factor analysis for the Murray State University students brings out the sexual differences even more strikingly. In addition to the five factors found in the regular analysis, a sixth factor which has somewhat higher loadings for males emerged. This factor reveals high positive loadings for Disinhibitory Sensation Seeking, Social Recognition, Play, Aggression, Hostile Daydreaming, Achievement-Oriented Daydreaming, and Dominance. Dominance showed a strong, negative loading. This factor, of the different ones which were derived, has substantial loading for the use of alcohol. There is a negative loading for infrequent use of beer, a strongly positive loading for use of beer, negative loading for infrequent use of liquor, and strong positive loadings for frequent use of liquor and wine. The women in the Murray State group were even more likely to show the traditional feminine pattern and, in keeping with this pattern, were less likely to engage in drinking of alcoholic beverages, apparently conforming to the religious and social demands of the rural areas from which they come. It is interesting to note that while achievement fantasies do seem strongly related to male orientation for the MSU group, this is by no means the case for the Yale female. Both sexes at Yale clearly share frequent fantasies of achievement.

DISCUSSION

While the results of the grand factor analysis, drawn from a sizeable sample of contrasting college students, are generally confirmative of earlier investigations using the IPI (Singer & Antrobus, 1972), the present case provides additional personality and drug use data not present in previous studies. Basically, Factor II, entitled Guilt-Dysphoric Daydreaming; Factor IV, Positive-Vivid Daydreaming; and Factor V, Anxious-Distractible Daydreaming are similar to factors obtained previously. Factor IV seems to generally reflect a kind of heightened state of awareness of imagery and daydreaming processes and a receptiveness to such, represented in active and diverse images. Factor II represents considerable guilty and aggressive fantasies, discomfort about daydreaming, and aggressive fantasies, together with Disinhibitory (SSS) tendencies. Factor V appears most strikingly to represent a sense of personal weakness and lack of control, conflicting and fearful fantasies, and low needs for Dominance, Achievement, Endurance, and Understanding. Of particular interest is the fact that none of these factors for this sample showed any association with drug or alcohol use, sex, or college.

Those students who showed the greatest involvement either with hard drugs or marihuana were likely to report relatively little interest in a variety of inner experiences. Instead, they seem to emphasize externally-oriented goals, such as seeking new experiences, desiring a sense of freedom from social constraints, and eschewing conformity and achievement. On the whole, they reflect a somewhat extroverted stance. This pattern is particularly evident in Factor I, where drug usage is related to Experience and Sensation Seeking, which reflects a tendency toward new and exciting experiences and a desire for an unconventional life-style. Factor III further supports the contention that drug use, in this specific instance marihuana only, seems to be related to special personality characteristics or social role stances that involve heightened self-determination in a nonconformist, novel, experience seeking orientation.

Thus, the picture of the drug user that emerges in this study is one of a widespread but moderate indulgence pattern across subcultural groups. Only among the MSU women, the most conforming, fearful, and traditionally minded subjects of the sample, are there found any sizeable numbers who have not experimented with drugs and alcohol. Whatever the pervasive "establishment" or legal view of drug usage may be, it is clear that young college students striving for autonomy, exploring new kinds of experiences, and emphasizing closeness with peers are likely to view drinking and trying some drugs, especially marihuana, as a natural part of their growth experience. With respect to the use of alcohol by itself, no specific pattern or trend emerged. Although alcohol is consumed by those who use drugs, its use was not widespread. On the whole, heavy drinking does not seem to characterize young people. Alcoholism is the sort of problem that emerges gradually and is more in evidence in the later years. Starker (1971) found, for example, among veterans' hospital admittees younger subjects were more likely to reflect problems of drug abuse while older patients were more likely to manifest drinking excesses.

In summary, use of "heavier" drugs by college students or extensive resort to marihuana seems to be limited to a very small minority who have already, in a sense, allied themselves with a "countercultural" orientation. Eschewing achievement and conformity, looking for new thrills or other sensations, this group somehow identifies drug use with autonomy. Here the pattern seems the same for students from both campuses, with perhaps the only differences reflected in the Yale drug users' greater resort to LSD and the MSU students' heavier reliance on the more easily available amphetamines (Segal & Singer, in press). The move toward heavier drug use seems unrelated to any clear-cut patterning of daydreams or personality variables other than an early established, somewhat extroverted orientation toward self-definition as a nonconforming, thrill seeking individualist and as a hedonist rather than as an achiever. The roots of a move toward strong indulgence in drugs may have to be sought in early adolescents' views of themselves as especially different from peers, with drug usage perceived as one method of establishing an identity with a nonconformist reference group.

In general, the results of this study point out that drinking and moderate drug use may be normative patterns for late adolescents entering college. Attempts to link moderate experimentation with drugs, especially marihuana, to any particular pattern of daydreaming or searches for complex inner experience would seem less useful in the future. Perhaps we need to examine more carefully the early roots of self-definition as a thrill seeking nonconformist to pick up the potential drug abuser in early high school years. It may also be useful to examine more intensively the life-styles and expectations about drinking and drug use of smaller samples of college youth. Research of this kind is currently under way in our overall program.

PART II
DISCRIMINANT ANALYSIS STUDIES

In summarizing the results of the research conducted thus far, the most essential finding is that students who revealed patterns of multiple drug use or of marihuana use only were likely to report little interest in inner or internal experiences. Rather, they seemed to give greater emphasis, in varying degrees, to externally oriented attitudes or behaviors (such as seeking new and stimulating experiences, desiring a sense of freedom from social constraints) and to play down conformity and achievement. The general term used to refer to such individuals is "sensation seekers," a term which may generally be analogous to an extroverted orientation. The focus of the following section is to delineate a series of rigorously controlled discriminant analysis studies undertaken to test hypotheses about the relationship between drug use, alcohol use, or nonuse of either and personality characteristics as assessed by some of the scales used in the study. Specifically, the first study to be cited was an attempt to test the significance of group separation in order to provide an efficient basis for examination of the nature of group membership and to cross validate these results. Using Locus of Control and Sensation seeking scores as predictor variables, the prediction involved classification into one of three discrete categories, separately for males and females: (a) alcohol-only use; (b) drug use; and (c) nonuse of either. The second series of discriminant analyses included four criterion groups (multiple drug use, marihuana-only use, alcohol-only use, and nonuse), set against 48 independent or predictor variables consisting of the 28 subscales of the IPI, the fifteen scales of the PRF, the I-E score, and the factor scores of the Sensation Seeking Scale.

METHOD

Locus of Control and Sensation Seeking Scores on Predictor Variables

A second, totally independent sample was obtained, and all subjects responded to a battery consisting of Rotter's I-E Scale, the Sensation Seeking Scale (SSS), and an Alcohol-Drug Use Survey (ADUS). On the basis of their responses to the ADUS, subjects were classified as: (a) nonusers of drugs or alcohol; (b) users of alcohol only; (c) users of marihuana only; and (d) users of multiple drugs. The nature of these group designations were as follows:

NONUSERS OF DRUGS AND ALCOHOL. This group consisted of subjects who reported never having drunk or just once or twice having sipped or tried beverage alcohol (beer or a form of hard liquor) and who reported no use of nonprescribed drugs, including marihuana, taken for pleasure and/or curiosity. The occurrence of this essentially abstinent group of young college students is not atypical because it is representative of the attitudes of many in the region in which Murray State University is located. Many of the students come from dry counties and abstinent backgrounds and tend to follow abstinent views, each of which is often associated with fundamentalist Protestant denominations. The presence of such a group provides a unique opportunity to investigate personality attributes of individuals who do not use alcohol or drugs.

ALCOHOL-ONLY USERS. This group was composed of subjects whose use of alcohol, in the form of beer, liquor, wine, or any combination of these beverages, ranged from several times a year to several times a week or more. No use of nonprescribed drugs for pleasure and/or curiosity also characterized this group.

MARIHUANA-ONLY USERS. Included in this category were subjects who reported having tried marihuana (infrequently, frequently, or experiementally) but who had not used or tried any other types or forms of drugs. All subjects in this category currently used or had used alcohol in addition to marihuana.

MULTIPLE DRUG USERS. This classification designated subjects who reported having used or tried any combination of the following types of agents (frequently, infrequently, or experimentally) for pleasure and/or curiosity: marihuana, amphetamines, methamphetamines, nonprescribed pain killers (e.g., codeine, morphine), nonprescribed tranquilizers, barbiturates, cocaine, LSD, mescaline or peyote, and heroin. All subjects in this group also reported past or present usage of alcohol.

DISCRIMINANT ANALYSIS
(SIX PREDICTOR VARIABLES)

Subjects (Validation Sample)

Subjects were 103 males and 200 females.

Criterion Groups

Three criterion groups were organized to represent the discrete variables: Group I was comprised of those subjects who were users of alcohol only; Group II consisted of nonusers of either alcohol or drugs; and Group III included those who were users of marihuana only or other drugs. The consolidation of the marihuana-only group with the other-drug group was deemed necessary in order to produce criterion groups of sufficient size and to prevent extreme discrepancies in size among all three groups.

Predictor Variables

The independent variables in this study consisted of the I-E scores and SSS scores, four subscales for females and five subscale scores for males. Hence the predictor set included five independent variables for female subjects and six independent variables for male subjects.

Statistical Analysis

The statistical procedure used was the Mahalanobis discriminant analysis (D^2) technique derived from a biomedical computer program.

RESULTS

Males-Validation Sample

The mean predictor scores (I-E and SSS scales), the coefficients of the discriminant functions, and the constants required for developing the three equations for predicting group membership for males are presented in Table 2. The analysis yielded a D^2 value of 89.37, which was statistically significant beyond the .001 level of significance for the twelve degrees of freedom on which the analysis was based. The profiles for the three criterion groups were therefore considered to differ significantly. These results presented evidence of the validity of the prediction measures in discriminating among users of alcohol only, users of drugs, and nonusers of either.

Females-Validation Sample

The results of the discriminant analysis for females yielded a D^2 value of 148.31, which was significant beyond the .001 level (df=10). Table 3 reports the results of this analysis. The three criterion groups were considered to differ significantly on the basis of the five predictor variables for females.

DISCUSSION

The results of the two analyses demonstrate clearly that there is a substantial, statistically significant difference between the three criterion groups for both sexes with respect to the predictor variables. The profile of the drug user group may be characterized as primarily reflecting a sensation-seeking orientation and as seeking external sources of reinforcement for its behavior. Nonusers, in contrast, tended to manifest an internal locus of control and less sensation-seeking behavior. The alcohol-only user group, except for one type of sensation-seeking behavior exhibited by the female group, revealed a more external locus of control and a higher level of sensation-seeking behavior than nonusers; but these levels were not comparable to those indicated by the drug use group. The one exception to the trend for the drug use group to show higher mean scores was the Thrill and Adventure mean score for female alcohol and drug users. In this instance, the means were reversed in that the alcohol-only group was slightly higher. It may be that this exception reflected not only basic sexual differences involved in sensation-seeking behavior but also an attitude or orientation toward interpreting as thrill and adventure-seeking behavior which differed from the male's viewpoint. Segal (1973) has reported that both males and females differed in their interpretation of sensation-seeking behavior.

Probability of Group Membership

One of the advantages of discriminant analysis is that the procedure leads to calculation of the probability of membership in each of the criterion groups. This calculation can be obtained by comparing the probabilities calculated from each of the discriminant equations to select the highest probability for particular group membership. Each subject is then predicted to belong to the group whose discriminant equation holds the highest probability for him. An analysis of hits and misses obtained by solving the discriminant equations for male and female subjects revealed the following results. The highest hit rate for both sexes was for the nonuse category: 49 females (77%) and 17 males (77%) were predicted to be members of this group. The second best hit rate occurred for both drug use groups: 37 females (69%) and 17 males (70%) were predicted correctly to be members of the drug groups. The alcohol-only use results were least predictive: 32 females (29%) and 14 males (41%) were predicted correctly to be members of the alcohol-only group.

Table 2

Discriminant Analysis Results for
Males on Six Predictor Variables

	Criterion Groups			Coefficients of Discriminant Function		
Predictors	I Alcohol (n=34) Mean	II Nonuser (n=22) Mean	III Drugs (n=47) Mean	I	II	III
1. I-E Score	9.94	9.23	12.04	0.84419	0.80873	1.01506
2. General SSS	11.26	9.09	13.45	0.75190	0.65988	0.75831
3. Thrill and Adventure Seeking	10.53	9.00	12.17	0.21608	0.19917	0.24465
4. Experience Seeking	8.18	6.05	11.40	0.13720	0.04607	0.50261
5. Disinhibition	6.38	4.18	7.70	0.72015	0.39778	0.82776
6. Boredom Susceptibility	6.38	4.63	7.46	0.33152	0.22907	0.29644
			Constant	-13.48563	-9.12892	-19.85973

Table 3

Discriminant Analysis Results for
Females on Five Predictor Variables

Predictors	Criterion Groups			Coefficients of Discriminant Function		
	I Alcohol (n=82) Mean	II Nonuser (n=64) Mean	III Drugs (n=54) Mean	I	II	III
1. I-E Scores	11.24	10.25	12.33	0.73018	0.73038	0.73228
2. General SSS	10.46	8.59	11.31	0.37510	0.49242	0.18897
3. Thrill and Adventure Seeking	8.94	7.34	8.74	0.51137	0.39593	0.48275
4. Experience Seeking	7.29	4.77	10.20	0.01160	-0.20146	0.50005
5. Disinhibition	5.18	2.78	6.26	0.49422	0.08842	0.53221
			Constant	-9.67606	-6.95580	-11.91135

CONCLUSION

On the basis of the predictions of the probability of group membership, it appears that the discriminant equation predicting drug use and nonuse yielded the highest probability for group membership. Predictions of alcohol use only would appear to be least reliable. The finding of a high hit rate for drug users and nonusers, or ability to discriminate between drug users and nonusers, is consistent with findings reported by Segal (1974), who discriminated between drug users and nonusers on the basis of different fantasy processes. The consistency of these discriminations between drug users and nonusers would suggest that important and significant personality characteristics exist with respect to users and nonusers and that more needs to be known about these differences. In addition, the present findings suggest that although alcohol-only users may differ from drug users and nonusers, predictability for alcohol-only use is problematical.

CROSS VALIDATION DISCRIMINANT ANALYSIS

In order to test the accuracy of the above findings it was decided to replicate and cross validate the discriminant results. This process was accomplished by use of a totally independent sample and by utilizing the predictor equations generated in the analyses cited above. The techniques developed for the cross validation study did not follow the procedure of going back to the original validity sample and showing the success ratios for predicting correct group membership. Rather, by inserting subjects' scores into the equations developed for the validation sample, it was possible to compare group profiles and to test for the accuracy of prediction of group membership. An added feature of the procedure is that it allows for cross validation studies with future independent samples.

Males-Cross Validation Sample

The 115 members of the male cross validation sample were classified on the basis of the discriminant equations which were developed from the data in Table 2. The means and subsample sizes for each of the three criterion groups as well as a summary of the group membership predictions for the cross validation male sample are given in Table 4. The overall results attested to the cross validity of the classification system. The profile means for the cross validation sample were generally in the same direction as those for the original sample. The probabilities of group membership generated by the analysis led to the following percentages of correct classifications: alcohol users-39% (16/41); nonusers-72% (18/25); drug users-61% (30/49). The frequencies in the classification matrix of Table 4 yielded a Chi-square value of 31.83, which for the four degrees of freedom upon which it is based is statistically significant beyond the .001 level. Therefore, there is ample evidence to conclude that the cell frequencies were not merely chance occurrences. The corresponding measure of association (Cramer's phi-ø'), demonstrating the degree of association between the predicted and actual group memberships, was found to be 0.31. This result was evidence that the prediction equations generated by the validity analysis were effective in providing proper classifications as to group membership and in discriminating among alcohol-only users, drug users, and nonusers on the basis of the predictor measures in this study. In reviewing these results, however, it should be observed that the strength of the cross validity came primarily from the success of predicting male nonsuers and drug users. The success ratio for predicting alcohol-only users and drug users is only slightly better than chance.

Females-Cross Validation Sample

The cross validation results for 183 female subjects are presented in Table 5. There was a dramatic difference between these results and those found for males. With the exception of the success ratio (74%) for predicting female nonusers, which matched quite closely that for males (72%), the correct classifications for alcohol-only users

Table 4

Cross Validation Results for Males

Predictors	I Alcohol (n=41) Mean	II Nonuser (n=25) Mean	III Drugs (n=49) Mean
1. I-E Scores	11.68	11.28	10.76
2. General SSS	10.27	9.68	13.37
3. Thrill and Adventure Seeking	9.44	8.56	10.96
4. Experience Seeking	7.46	5.20	11.24
5. Disinhibition	6.24	3.72	6.26
6. Boredom Susceptibility	6.00	5.48	6.94

Classification Results

Actual Group Membership	Predicted I	Predicted II	Predicted III	Total
I	16*	14	11	41
II	6	18*	1	25
III	10	9	30*	49
Total	(32)	(41)	(42)	115

$\chi^2 = 31.83$; df=4; $p < .001$

* Correct prediction

Table 5

Cross Validation Results for Females

	Predictors	I Alcohol (n=80) Mean	II Nonuser (n=47) Mean	III Drugs (n=56) Mean
1.	I-E Scores	12.35	10.15	12.00
2.	General SSS	9.68	9.77	12.93
3.	Thrill and Adventure Seeking	8.63	8.57	10.13
4.	Experience Seeking	6.38	5.74	10.63
5.	Disinhibition	4.90	3.38	5.91

Classification Results

Actual Group Membership	I	II	III	Total
I	21*	36	23	80
II	3	35*	9	47
III	37	4	15*	56
Total	(61)	(75)	(47)	183

$\chi^2 = 59.06$; df=4; $p < .001$

* Correct Prediction

and drug users were found to be disappointingly low. They were, respectively, 26% and 27%. These results probably can be explained by the relative instability of the profile means, especially that for the Experience Seeking scale. Although the results of the test for independence and the measure of association ($\emptyset$=.40) for the frequencies of the classification matrix in Table 5 compared favorably with those for males, close inspection of the data on this table reveals that the cause is different. For males, the proportion of correct classifications for each of the three criterion groups was consistently higher than that for any specific misclassification. For females, on the other hand, there was a substantially greater tendency to classify actual alcohol users as nonusers and actual drug users as alcohol users.

DISCUSSION

The results of the cross validation procedure indicated quite strongly that the predictor variables were associated with use versus nonuse of drugs. This distinction is particularly evident for males and also primarily points out that I-E, and particularly sensation, are important factors associated with nonuse of drugs in females. The inability to cross validate findings with respect to alcohol use for both sexes and drug use for females would appear in part to be related to the social-cultural significance of alcohol and sex differences with respect to sensation-seeking behavior, as discussed previously.

FURTHER DISCRIMINANT ANALYSES (48 VARIABLES)

The results of the discriminant studies carried out above indicated that significant group separation and fairly good prediction of use or nonuse of drugs could be obtained using six variables as predictors. The question then raised was, could group separation and accurate prediction be obtained using the test battery (48 Variables: IPI; PRF; I-E; SSS) utilized for the factor analytic study cited above. As such, a stepwise discriminant analysis was applied to the test battery. The test battery scores were the independent variables, set against four criterion groups: nonusers, alcohol-only users, marihuana-only users, and drug users. Since a large number of independent variables are involved, a stepwise discriminant analysis was applied to the data because the procedure adds or subtracts one predictor at a time to the equation seeking the "best" set of predictors. Variables are added or dropped according to the statistical significance of their contribution to the reduction of uncertainty about the criterion. Separate analyses were run for males and females. The criterion levels for inclusion and deletion were set as follows: F-level for inclusion was 1.0; F-level for deletion was .50; the tolerance level was set at .10. These liberal levels were set in order to add more variables which might be necessary in order to generalize to noncollege samples in which there may be a shift in the criterion. The classification option of prior probabilities of group membership was set equal to the number of subjects in each group divided by the total number of subjects. That is, the probability of group membership was proportional to the actual group membership in the observed sample.

An additional aspect of this analysis was to rescore the Sensation Seeking Scale scores for each subject after excluding responses to any scale item referring to drug or alcohol use. Thus, deletion of such items from the subject's factor score assured that any results obtained were not compounded by including an item which expressed a clear preference or nonpreference for drugs or alcohol. The discriminant analyses were run on this revised data, together with the other independent variables, using the BMD Program 074 Stepwise Discriminant Analysis Program developed at UCLA, dated February, 1973. The subjects for these analyses were the same as those which constituted the sample groups for the factor analytic study. In this case the MSU and Yale groups were combined, by sex, to form two large sample groups.

To reiterate, a stepwise discriminant analysis was applied to the data utilizing all the test battery scores (48 variables; IPI; PRF; I-E; and revised SSS) as the independent variables against four criterion groups: functional nonuse (males, N=31; females, N=92); marihuana-only use (males, N=85; females, N=69); alcohol-only use (males, N=77; females, N=116); and multiple drug use (males, N=74; females, N=46).

RESULTS

The results of the analysis for males is presented in Table 6, for females in Table 7. The results of both analyses indicated that for both males and females the best predictor variable was the Experience Seeking Scale of the SSS. Interestingly, for the female sample the next best predictor continued to be a sensation seeking scale variable, Disinhibition, followed by PRF subscales Infrequency, Impulsivity, Achievement, and Autonomy. The next best predictors for males, in sequence, were Boredom and Present-Oriented Daydreams, followed by Disinhibition Sensation Seeking and three more daydreaming scales: Heroic Daydreaming, Night Dreaming, and Distractibility Daydreaming. Thus, for females it appears that differences in sensation seeking behaviors and personality variables are the chief discriminators between the four groups. For males sensation seeking is also important, but daydreaming variables also appear to have a role in discriminating group membership.

Tables 6 and 7 also present data indicating the percent of classification in each group based on the 20 variables for males and the 26 variables obtained for females. The hit rates were generally good, with an overall rate of 54% (144/267) for males and 59% (190/323) for females.

Also included in Tables 6 and 7 are the coefficients for the first canonical variable, which reflects how each raw score is weighted in order to discriminate between the four criterion groups.

Tables 8 and 9 list the coefficients of discriminant function for the 20 variables derived for males and the 26 variables obtained for the females. These values represent how much separation there is between the four criterion groups with respect to each of the discriminating variables after the mean of each variable was multiplied by the appropriate Beta weight. Inspection of these tables continue to indicate that the four male groups are differentiated by different levels of Experience Seeking, Boredom, and Present-Oriented Daydreams; however Disinhibition Sensation Seeking, Experience Sensation Seeking, and the PRF scales of Infrequency, Impulsivity, and Achievement apply for females.

DISCUSSION

The findings of the stepwise discriminate studies indicate that a specific pattern discriminating the four criterion groups could be obtained separately for males and females in the collegiate samples used herein. The major variable which emerged consistently in each of the analyses as being the most significant discriminator was the Experience Seeking Scale of the SSS. This variable showed significant proportional representation for each sex in each of the groups. The nonuse group showed the lowest level, and the drug use group the highest. Most often the alcohol-only group resembled the nonusers and the marihuana-only group was close to the drug group. There are one or two instances, however, where the alcohol and marihuana groups reversed positions. But the dramatic contrast is, as to be anticipated, between drug users and nonusers. It is the male users of both polydrugs and marihuana who experience the most boredom in daydreaming, who are most oriented to the present in fantasy, and who show disinhibiting tendencies. The nonusers present a contrasting image, while the alcohol-only users are in-between.

It is also the female marihuana and drug user who is oriented most toward experience seeking and who shows higher levels of disinhibitory behaviors. Interestingly, the female drug user, in contrast to the female marihuana-only user, shows the greatest tendency to act in a careless, noncompliant manner. The nonuser, in contrast, is more conforming. Unexpectedly, the female drug user tends to be the least impulsive (in terms

Table 6

Summary Table of Stepwise Discriminant Analysis for Males

Step Number	Variable Entered	F-Value to Enter or to Remove*	U-Statistic	Coefficients For First Canonical Variable
1	Experience Seeking SS	24.03	.78	-.19159
2	Boredom DD	5.04	.74	-.07372
3	Present-Oriented DD	4.00	.71	-.05769
4	Disinhibition SS	4.32	.68	-.15622
5	Heroic DD	4.13	.64	03497
6	Night Dreaming	3.66	.62	-.02616
7	Distractibility DD	2.89	.60	.02999
8	Endurance	1.88	.59	.00251
9	Curiosity: Impersonal DD	1.82	.57	-.01675
10	Curiosity: Interpersonal DD	1.70	.56	-.01100
11	Aggression	1.58	.55	-.00123
12	Understanding	1.70	.54	-.03753
13	Sexual DD	1.92	.53	.02831
14	Thrill and Adventure Seeking SS	1.60	.52	.09533
15	Harm Avoidance	3.75	.50	.09531
16	Nurturance	1.29	.49	.05483
17	Self-Revelation DD	1.61	.48	-.02527
18	Dominance	1.33	.47	02199
19	Future-Oriented DD	1.10	.47	-.01909
20	Bizarre Improbable DD	1.24	.46	-.02038

N=267, analysis based on 48 initial variables

* All figures have been rounded to two places

Percent of Cases Classified in Groups

	Functional Nonuse	Alcohol	Marihuana	Multiple Drugs
Functional Nonuse	42	35	16	06
Alcohol	05	57	28	08
Marihuana	04	26	48	22
Multiple Drugs	00	14	24	62

Table 7

Summary Table of Stepwise Discriminant Analysis for Females

Step Number	Variable Entered	F-Value to Enter or to Remove*	U-Statistic	Coefficients For First Canonical Variable
1	Experience SS	49.87	.68	-.19074
2	Disinhibition SS	6.26	.64	-.16307
3	Infrequency	4.20	.62	.06058
4	Impulsivity	3.73	.60	.00760
5	Achievement	4.41	.57	.02310
6	Autonomy	3.04	.56	-.06044
7	Future-Oriented DD	2.46	.54	.01720
8	Self-Revelation (DD)	2.35	.53	-.02053
9	Auditory Imagery DD	1.67	.52	-.01963
10	Visual Imagery DD	2.13	.51	.01853
11	Harm Avoidance	1.60	.51	.08224
12	General SS	1.64	.50	.02240
13	Exhibitionism	1.44	.49	.00486
14	Dominance	1.45	.48	.04565
15	Understanding	1.36	.48	-.04735
16	Distractibility	1.26	.47	-.00353
17	Guilt DD	1.59	.46	.00582
18	Hostile DD	1.75	.46	-.01131
19	Achievement Oriented DD	1.11	.45	-.02959
20	Social Recognition	1.41	.44	.07101
21	Bizarre-Improbable DD	1.25	.44	.01842
22	Order	1.10	.43	-.03763
23	Thrill and Adventure SS	1.07	.43	.01670
24	Curiosity: Impersonal (DD)	1.05	.43	.01285
25	Mentation Rate	1.02	.42	.02285
26	Affiliation	1.02	.42	-.00618

N=323, analysis based on 48 initial variables

* All figures have been rounded to two places

Percent of Cases Classified in Groups

	Functional Nonuse	Alcohol	Marihuana	Multiple Drugs
Functional Nonuse	57	34	07	03
Alcohol	22	65	09	04
Marihuana	14	20	54	12
Multiple Drugs	07	20	17	57

Table 8

Coefficients of Discriminant Function for 20 Variables Derived From the Stepwise Discriminant Analysis for Males

Variable	Functional Nonuse	Alcohol	Marihuana	Polydrugs
Experience Seeking	.92611	1.13977	1.32478	1.41543
Boredom	1.38890	1.38640	1.43900	1.54111
Present-Oriented DD	1.65663	1.76368	1.83458	1.82124
Disinhibition	1.95452	2.23553	2.37038	2.40534
Heroic DD	-0.28696	-0.31968	-0.34433	0.37485
Night Dreaming	0.22239	0.20064	0.20643	0.26886
Distractibility	0.32565	0.36056	0.35125	0.27742
Endurance	1.87406	1.87864	1.98557	1.85345
Curiosity: Impersonal	0.43193	0.45719	0.45081	0.48138
Curiosity: Interpersonal	0.22016	0.15021	0.20056	0.20395
Aggression	-0.17471	-0.15743	-0.30218	-0.14075
Understanding	-0.00242	0.04413	-0.04315	0.11574
Sexual DD	-0.10624	-0.13790	-0.13251	-0.18385
Thrill and Adventure Seeking	2.71387	2.85829	2.87133	2.56911
Harm Avoidance	3.45752	3.55525	3.51191	3.30033
Nurturance	0.84058	0.77850	0.68103	0.70729
Self-Revelation	0.44484	0.42839	0.48419	0.48374
Dominance	0.66489	0.75800	0.73339	0.66353
Future-Oriented DD	0.71680	0.77360	0.78944	0.78237
Bizarre-Improbable DD	0.89395	0.94587	0.95616	0.96097

Table 9

Coefficients of Discriminant Function for 26 Variables Derived

From the Stepwise Discriminant Analysis for Females

Variable	Functional Nonuse	Alcohol	Marihuana	Polydrugs
Experience SS	-0.79576	-0.73753	-0.47235	-0.39495
Disinhibition SS	0.41724	.74390	.77577	.89498
Infrequency	1.10599	1.06226	0.73790	1.26737
Impulsivity	1.70912	1.59268	1.72854	1.56032
Achievement	1.69604	1.63958	1.77660	1.46657
Autonomy	2.61053	2.62870	2.68110	2.77453
Future-Oriented DD	0.14000	0.18390	0.07606	0.18543
Self-Revelation	0.44591	0.42255	0.49443	0.44833
Auditory Imagery	-0.20664	-0.27600	-0.18784	-0.21129
Visual Imagery DD	0.30425	.35785	.27305	.31443
Harm Avoidance	4.00203	4.00085	3.91874	3.78362
General SS	0.16360	0.32760	0.18641	0.18799
Exhibitionism	0.32135	0.33767	0.38650	0.24033
Dominance	-0.60030	-0.69791	-0.75833	-0.67187
Understanding	0.64256	0.71532	0.79958	0.70112
Distractibility	0.36691	0.34129	0.38841	0.33980
Guilt DD	0.06344	0.11497	0.04409	0.10673
Hostility	0.15000	0.10200	0.16643	0.13408
Achievement-Oriented DD	-0.37382	-0.35729	-0.31211	-0.31884
Social Recognition	0.83782	0.84614	0.74711	0.67896
Bizarre-Improbable DD	0.35706	0.36018	0.32038	0.33202
Order	0.92785	0.92226	0.94904	1.04240
Thrill and Adventure SS	3.18834	3.02857	3.13780	3.05024
Curiosity: Impersonal	0.34304	0.35795	0.31325	0.34106
Mentation Rate	0.50883	0.50203	0.48143	0.44773
Affiliation	1.58831	1.66955	1.66403	1.59132

of weighted scores) than the other groups and to put less stress on achievement and more stress on autonomy.

Thus, those likely not to use drugs are individuals who tend to conform, not seek novel situations, and who are oriented towards achieving. Female nonusers would tend to be somewhat dependent individuals, and male nonusers would tend to daydream somewhat less than users.

In contrast to the nonusers, those who might tend to use or experiment with drugs are those who are physically active; seek stimulating, exciting, or novel situations; strive for autonomy; and focus less on achievement. For males, those who tend to use or experiment with drugs are somewhat oriented toward inner experiences in the form of daydreaming or fantasy expressed in thinking about present happenings, have heroic-type fantasies, and find little interest in their undertakings or surroundings (Boredom Daydreaming). These characteristics differ sufficiently in drug users, nonusers, alcohol-only users, and marihuana-only users so as to allow fairly accurate prediction of group membership.

It should be noted that the report of the stepwise analysis represents an exploratory first step in the analysis of data obtained over a two-year period from Yale and Murray State University. This particular analysis represents the initial phase of more detailed studies which will be presented in forthcoming reports. Additional research will also be presented elaborating the personality characteristics associated with sensation-seeking behaviors.

SUMMARY

The relationships between personality and environmental variables and drug and/or alcohol use or nonuse in young adults were considered in two manners as part of a larger study. First, the patterns of inner experiences such as daydreaming and imagery processes related to drug use, general personality characteristics, and other dimensions were explored. Second, a series of stepwise discrimination studies using a wide range of personality and imaginal process variables to discriminate between drug users and nonusers were performed.

The factor analytical techniques employed in the initial portion of the study indicated a moderate indulgence pattern across subcultural groups for the drug users. However, no specific pattern or trend emerged for the use of alcohol alone. The discriminate studies consistently demonstrated that the most significant discriminator relative to drug use was the Experience Seeking Scale of the Zuckerman SSS. Other variables, such as Disinhibition (SSS), also discriminated among the four criterion groups (drug users, nonusers, alcohol-only users, and marihuana-only users) but not as dramatically, although they too accurately predicted group membership.

The research reported will be extended to incorporate and elaborate the personality characteristics associated with sensation-seeking behaviors.

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SELF-ESTEEM AS A PREDICTOR OF ADOLESCENT DRUG ABUSE

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SELF-ESTEEM AS A PREDICTOR OF ADOLESCENT DRUG ABUSE

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This paper focuses on two components of prediction of resistance and vulnerability to drug abuse: a predictive model which highlights the role of self-esteem, and a review of the author's studies on the relationship between self-esteem and drug abuse.

A PREDICTIVE MODEL OF DRUG ABUSING BEHAVIOR

A theoretical approach to research in drug use needs to embrace both sociocultural and personality variables, thus comprising a psychosocial approach (Braucht, Brakarsh, Follingstad, and Berry, 1973). Based on such an approach, this model proposes six interrelated variables for predicting and identifying relative susceptibility to drug use and abuse. The variables include availability of drugs, the reinforcing quality of drug use, social support (peer and parental), value stance toward drug-related issues, coping skills, and psychological well-being. Each variable is proposed as a continuum and is listed in Figure 1 with descriptions of the two ends of the continuum. The greater the deficiency on each of the variables and the more variables on which a deficiency exists, the higher the probability that the person will engage in drug abuse behavior. Empirical support for inclusion of the six variables in this model is stronger for some than for others. Some of the more salient findings are summarized here.

Statistically significant contrasts are commonly found between drug abusers and control groups on measures of psychological well-being. Such studies commonly correlate concurrent drug use patterns and personality variables such as history of depression and anxiety, MMPI scales, or other personality measures (Mellinger, Balter, Manheimer, Cisin, and Parry, 1974; McAree, Steffenhagen, and Zutlin, 1969). Braucht, Brakarsh, Follingstad, and Berry (1973), in a current review of literature, describe personality variables identified with use of alcohol, narcotics, and psychedelic drugs. Personality traits among adolescent drinkers include high aggressiveness and impulsiveness, low self-esteem, high anxiety, depression, and a general lack of success in attainment of life goals. Studies of narcotics users focus on psychopathological constructs. Narcotic users are characterized as immature, insecure, irresponsible, and egocentric. The authors point out that psychological predispositions to enter this population may be different for different sociocultural strata, different patterns of drug use, and varying psychological functions of drug use. Personality traits among adolescent psychedelic users are reported to evidence a wide range of personality characteristics including anxiety, introversion, schizophrenia, hedonism, rebellion, and nonconformity, to mention only a few of an extensive list of potential determinants.

Adequacy of problem solving and alternatives for constructive handling of pain and stress is not a commonly researched issue in the study of drug abuse. These skills include data-collecting and decision-making processes, as well as constructive modes of emotional expression. The basis for inclusion of this variable in the prediction model is logical rather than empirical. The assumption is that high level coping skills will alleviate psychological stress which may lead to drug use.

Figure 1

Proposed Variables for Predicting Susceptability to Drug Abuse

Predictor Variable	Abuse Resistant Characteristic	Abuse Vulnerable Characteristic
1) Availability of Drugs	Accessibility to drugs is low	Accessibility to drugs is high
2) Reinforcing Valence of Drug Use	Use of drug is negative reinforcer (I fear or experience harm to myself)	Use of drugs provides a positive experience (I felt great/better)
3) Social Support	Peer group or parents evidence intolerance for drug use	Peer group and parents express tolerance or approval of drug use
4) Value Stance	Personal value system is nonsupportive of drug abusing patterns	Personal value system supports the use of chemicals to alter mood and relieve pain or distress
5) Coping Skills	More varied and/or adequate alternatives for coping with stress are used, such as good problem solving skills, emotional balance strategies of self-disclosure, emotional expressiveness, and interpersonal closeness	Limited and/or rigid range of alternatives is used and skills in problem solving and emotional expression strategies are less adequate
6) Psychological Well-Being	Psychological pain and stress is relatively absent	High and chronic need to alter mood due to a) psychic pain or b) thrill seeking is evidenced

Personal values and preferences congruent with drug use are explored as predictors in a study by Stokes (1974). Factors identified as fear of personal reaction to drugs, respect for illegality of psychedelic drug use, sensual hedonism, and philosophical hedonism were significantly related to drug use patterns ($p < .05$), especially use of alcohol, marihuana, hallucinogens, amphetamines, and barbiturates. Stokes found fear of personal reaction to drugs and the general tendency to use drugs the most important factors for predicting drug use.

The role of peer pressure and parental models as related to drug use is explored by Kandel (1973), who reports greater use of drugs among youth whose peers support drug use patterns and an even greater likelihood of drug use if parents are also users. Additional support for a positive relationship between drug use and parental models or peer group pressure is an aspect of several studies reviewed by Braucht, Brakarsh, Follingstad, and Berry (1973).

The reinforcing valence of the drug experience itself has been cited as a contributor to both drug use and abstinence. Keeler (1968) relates that marihuana users report relief from tension, experience of well-being, euphoria, and rapid thought as reasons for continued use. Reasons for discontinued use included adverse reactions and displeasure with the marihuana effect. This reflects the function of an immediate and direct experience of pain or pleasure as one possible determinant of drug use.

Availability of drugs is anticipated to be useful as a predictor of which drugs will be selected for use and not as a predictor of extent of drug use. Ready accessibility at low financial cost and low risk of negative sanctions such as arrest will likely predict the drug of choice.

The six variables included in the model are not exhaustive. The model could be enlarged or streamlined for greater cost-effectiveness. Specifications of drugs and populations to be studied also need to be made. For example, it is possible that susceptability to multiple drug use may be predictable while a tendency to moderate use of marihuana or alcohol may not.

SELF-ESTEEM AS A PREDICTOR OF DRUG ABUSE

This section focuses on self-esteem as a salient component of the predictor variable psychological well-being.

The logic of including self-esteem in a psychosocial predictive model may be cast in an antecedent-organism-consequent paradigm. Antecedents to drug abusing behavior may be classified as situational (interpersonal and demographic) and psychological. The psychological processes function as the intervening variables which help account for variance in outcome behavior in response to situational variables. It is not the events or situations themselves but the response patterns of the individual to those situations which contribute to susceptability to drug abuse. Specific classes of situations may contribute to drug abuse, primarily because they tend to have a common impact via the psychological response patterns on a significant proportion of those individuals.

Thus, it is proposed that self-esteem is a response pattern variable which mediates specific situational variables toward the behavioral outcomes of drug abuse. Self-esteem is impacted by a myriad of external events and personal circumstances such as parental criticism, lack of peer acceptance, marginal or threatened poor performance, and high standards. The stress or pain measured through an uncertain or threatened self-esteem may leave the individual vulnerable to other pressures which influence him toward drug abuse. To the person who lacks the security and satisfaction afforded by a consolidated positive self-esteem, the multiple reinforcers of peer support for drug use, release from tension, comfort, or diversion have greater appeal.

DISCRIMINATION OF PERSONS RESISTANT AND VULNERABLE TO DRUG ABUSE

In a recent project the author constructed the Self Assessment Scales, a multidimensional measure of self-esteem. As part of initial validation studies, 396 white suburban 9th, 11th, and 12th grade students and 22 drug abusers (median age, 21) currently in a residential treatment center were tested. Multivariate analysis of covariance was conducted contrasting the drug-abusing and normal populations on the seven Self Assessment Scales, with covariance adjustment made for age and sex. The multivariate test of significance of the contrast was greater than .0001, indicating lower scores among the drug abusers, as shown in Table 1 below:

Table 1

Significance of Contrast of Scale Scores
Between the Norm Group and Drug Abusers

Scale	Single Variable Contrast (p less than)
Freedom of Feelings	.0144
Evaluation	.0003
Discrepancy	.0002
Performance Independence	.0033
Social Independence	.0071
Ease of Disclosure	.0001
Well-Being	.0009

The Self Assessment Scale has 71 items. To identify which single items were most discriminating between normals and the initial group of drug abusers, a t-test was run on each item. Among a number of items showing significant differences, thirteen items showed a sharp difference in response patterns. On these items drug abusers made claims of "completely" or "mostly" true only rarely in response to positive self-descriptive statements. A multiple discriminant analysis using six of these items in a summed score (Figure 2) contrasted three groups: drug abusers, normal respondents, and 15 adolescents who had "successfully" completed treatment for drug abuse.

Figure 2

Items Included in Discriminant Analysis
Between Drug Abusers and Normal Group

I accept my mistakes or poor performance.

I easily share my inside self and feelings with others.

I feel good about myself.

I have a sense of an easy flow, aliveness and comfortableness with myself.

I feel comfortable expressing a wide variety of feelings whether they be love, anger, hostility, resentment, joy, etc.

It is easy for me to talk about my weaknesses to others.

Group differences were accounted for by a single discriminant function ($p < .001$). The distribution of discriminant scores for individual subjects within the three groups are summarized in the first three rows of Table 2. The range of scores for the combined groups was -15 to + 16. While no drug abuser had a score above 0, 44% of the normal group had scores of +1 or higher. Among the treated group, 67% had scores in this upper range. Based upon the contrast of these groups, this cluster of items may function as a measure of susceptability to drug abuse.

Discriminant analysis classified the subjects in the three groups as shown in the first three rows of Table 3. While 18 of 22 drug abusers were correctly classified, 14% of the normal group were identified as abusers. All treated drug abusers were classified as normals. Given that some limited number among the "normal" group may be potential drug abusers or drug abusers not yet under treatment, it is difficult to make an accurate estimate of "misses" in the normal group. If self-esteem level is a single predictor of vulnerability to drug abuse, one might infer that a certain proportion of those identified in the normal group are, in fact, highly vulnerable to drug abuse.

However, the populations included in this study do not provide an adequate data base for making such an inference. First, validity for the discriminant function needs to be established across diverse groups of drug abusers. In the study cited, the estimate of relationship between drug abuse and self-esteem may be confounded by effects of age differences and treatment modality. The median age of the normal group was 16, and they were in the typical patterns of school attendance at the time of testing. The median age of the drug abusers was 21, and they were in the midst of an intensive residential treatment program at the time of testing. It is important to establish whether the uniqueness of the self-esteem scores among the drug-abusing group is characteristic of drug abusers generally, is unique to older drug abusers, is characteristic of drug abusers in the midst of an "insight" based treatment program, or is simply a quality of this particular group of drug abusers.

To check these alternative hypotheses, additional testing has been initiated among a group of younger adolescent drug abusers (median age, 16) from the same residential treatment program from which the posttreatment sample was drawn. Additional subjects from that population are being gradually added as testing is done at time of admission to the treatment center. Classification of eight of these younger, pretreatment adolescent drug abusers on the six item discriminant score resulted in only three adolescents being similar to the initial "in treatment" group (see Table 3, Row 4). The discriminant contrast so striking for the in-treatment group is not as effective for classifying this group of pretreatment adolescents. The distribution of this group on the discriminant score is shown in Table 2, Row 4.

Use of the full scales from the Self Assessment Scales provides a more useful profile of the pretreatment adolescents. One-way analysis of variance was used to contrast the four groups on each of five scales. Four of the five contrasts were significant ($p < .005$). Table 4 reports the outcome of this analysis. (Note: in this analysis, the N for pretreatment abusers increased to 12). Each contrast shows a similar rank ordering of groups. Ranked from low to high, the in-treatment abusers ranked lowest, followed by pretreatment adolescent abusers, the "normal" group, and the posttreatment adolescents. On this evidence, one might tentatively conclude that successful completion of the treatment program was marked by an accompanying increase in self-esteem.

Table 5 lists the population groups by homogeneous subsets on each scale. This data highlights similarities betweeen the intreatment and pretreatment drug abusers. The intreatment and pretreatment abusers were significantly ($p < .05$) lower than the other groups on Freedom of Feelings, Disclosure, Performance Independence, and Acceptance. The definition of each of these scales and their internal reliability are listed in Table 6.

The populations used in this study place limitations on inferences which can be made from the data. The drug abusers were selected from only two treatment centers. The normal school population, though, used to represent a relatively drug free group, probably had some drug abusers within it. Before further conclusions are drawn about the predictive power of self-esteem for drug-abusing behavior, it will be necessary to clarify whether lower self-esteem is a characteristic across a wider population of drug abusers.

Table 2
Distribution of Discriminant Scores for Each Group

Group	Scores -15 thru -11	-10 thru -6	-5 thru 0	1 thru 5	6 thru 10	11 thru 16	Unclassified	Total
Intreatment	2	9	11	-	-	-	-	22
Normals	11	46	163	112	43	12	9	396
Posttreatment	-	-	6	3	4	2	-	15
Pretreatment	2	1	2	2	1	-	-	18

Table 3
Classification of Subjects Through Discriminant Analysis

Actual Group	Predicted Group*			Mean Score for Summed Items
	1	2	3	
1. Intreatment	18	4	0	17.7
2. Normals	57	339	0	24.5
3. Posttreatment	0	15	0	28.6
4. Pretreatment	3	5	0	24.3

*Predicted Groups
1 = Drug Abusers in Treatment
2 = Normal School Population
3 = Posttreatment Adolescents

Table 4
One-way Analysis of Variance of Groups on Self Assessment Scales

Scale	Intreatment	Pretreatment	Normals	Posttreatment	Significance
	Mean Scores				
Well Being	28.9	28.6	34.2	36.4	.001
Freedom of Feelings	28.5	31.4	34.1	39.4	.001
Ease of Disclosure	20.6	22.1	27.4	27.4	.000
Performance Independence	20.1	22.0	24.8	26.0	.004
Social Independence	44.3	45.1	48.7	50.6	.229
Acceptance (Summed Scales)	142.5	149.2	168.9	177.5	.000

Table 5
Homogeneous Subsets of Groups Which Significantly Contrast ($p < .05$) on Self Assessment Scales

Scale	Group Subset	Intreatment	Pretreatment	Normals	Posttreatment
Well Being	← (no significant subset contrasts) →				
Freedom of Feelings	1	x	x		
	2		x	x	
	3				x
Ease of Disclosure	1	x	x		
	2			x	x
Social Independence	← (no significant subset contrasts) →				
Performance Independence	1	x			x
	2		x	x	x
Acceptance (summary scale)	1	x	x		
	2			x	x

Table 6

Scales and Scale Reliability for the Self-Assessment Scales

Scale		No. of Items	Cronbach Alpha
Well Being	Basic comfortableness with self	7	.87
Ease of Disclosure	Ease experienced in sharing one's private or inside experience with others, and having others know you well	5	.81
Freedom of Feelings	Comfort with experiencing a full range of feelings and experiencing emotional closeness in relationships	8	.89
Social Independence	Degree to which good feelings about self are independent of the receipt of approval of other people	7	.88
Performance Independence	Degree to which good feelings about self are dependent upon performing tasks and skills well	6	.75

DISCUSSION

Efforts to identify the role of self-esteem in drug abuse behavior need to clarify two major issues: (a) the role of lower self-esteem as a contributor to susceptibility to drug abuse, and(b) the lowering of self-esteem attributable to personal consequences of the drug life-style and treatment. Measures of concurrent drug use patterns and self-esteem across a wide spectrum of adolescent population, including identified abusers entering treatment, can provide some answers. However, accurate identification of antecedents to drug use patterns need to be verified through longitudinal studies which identify status of subjects on possible correlates long before actual use of drugs is begun.

The effects of "insight" based treatment for drug abuse may also influence what is being measured in a study of self-esteem. As the abusers learn to use introspection, heightened self-awareness, and expressiveness, they focus on intrapersonal processes which were a part of neither their language nor their awareness prior to treatment. Thus, the treatment program itself may contribute to heightened self-report of low esteem through greater awareness and focus or perhaps lowered self-esteem consequent to the process of the treatment itself. Nevertheless, the interaction of self-esteem and treatment modality is a provocative area for research. Measurement of self-esteem across treatment modalities is fraught with variables which are difficult to control, such as changing awareness, group norms for self-disclosure characteristics of treatment programs, and perceptions of living in a supportive environment.

SUMMARY

A six variable model is suggested as a tool to identify adolescents who are resistant or vulnerable to drug abuse. Variables in the model include availability of drugs, reinforcing valence of drug use, social support (peer and parental), value stance, coping skills, and psychological well-being. Self-esteem is proposed as a salient variable within the broader category of psychological well-being. The Self Assessment Scales are used as a measure of self-esteem in these studies. Items with significant differences ($p < .001$) between groups of drug abusers and a normal population of

adolescents are combined into a single measure on which to categorize subjects as drug-abusing or normal. This measure provides effective classification only among the normal group and an in-treatment group of drug abusers. The multidimensional construct of self-esteem provides significant contrasts between normal and drug-abusing populations. The limited sampling among drug-abusing populations is a basis for urging further study before claiming low self-esteem as a contributor to drug abuse.

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Scales, Scale Reliability, and Items From the Self Assessment Scales* Used in This Study

Well-Being: basic comfortableness with self

Even though I have a lot of natural limitations, I believe in myself.

Deep down inside me something tells me I'm just not right.

I feel good about myself.

I have a sense of an easy flow, aliveness, and comfortableness with myself.

I feel uncomfortable and unhappy about myself.

I feel warm and happy toward myself.

I am sluggish, awkward, and uncomfortable with myself.

Ease of Disclosure: ease experienced in sharing one's private or inside experience with others and having others know you well.

When people say nice things about me, I feel bad because I think that if they knew me as I really am, they wouldn't think well of me.

I stretch the truth about myself, my things, and what I've accomplished.

I am fearful of allowing others to know my "real" self.

I'm afraid that if people I like find out what I'm really like, they'd be disappointed.

I do not allow others to know my real self.

Freedom of Feelings: comfort with experiencing a full range of feelings and experiencing emotional closeness in relationships.

I offer my own opinions and convictions without feeling uneasy.

I easily use my whole self to express feelings and to communicate.

I feel comfortable expressing a wide variety of feelings whether they be love, anger, hostility, resentment, joy, etc.

I easily share my inside self and feelings with others.

I easily experience a meeting of minds and deep understanding with others.

It is easy for me to talk about my weakness to others.

I like feeling close to other people.

I easily experience warm feelings between me and other people.

---

* Self-Assessment Scales, Copyrighted 1975, Ardyth Ann Norem - Hebeisen

Social Independence: degree to which good feelings about self are independent of the receipt of approval of other people.

I feel shy and self-conscious when I am with other people.

I am concerned about what others think and say of me.

I have a strong need to gain recognition and approval.

I judge how worthwhile I am by comparing myself with others.

If people talk about me or criticize me I get upset and worried.

I need to please others in order to feel good.

My feeling of worth and value is very easily influenced by the opinions, comments, and attitudes of others.

Performance Independents: degree to which good feelings about self are dependent upon performing tasks and skills well.

When I fail to live up to my ideals I get upset.

I accept my mistakes or poor performance.

I get upset when I do something poorly or clumsily.

It is very important to me to prove my value and ability.

When I lose in a game of skill I feel angry or depressed.

I lose respect for myself when I don't do well at a task.

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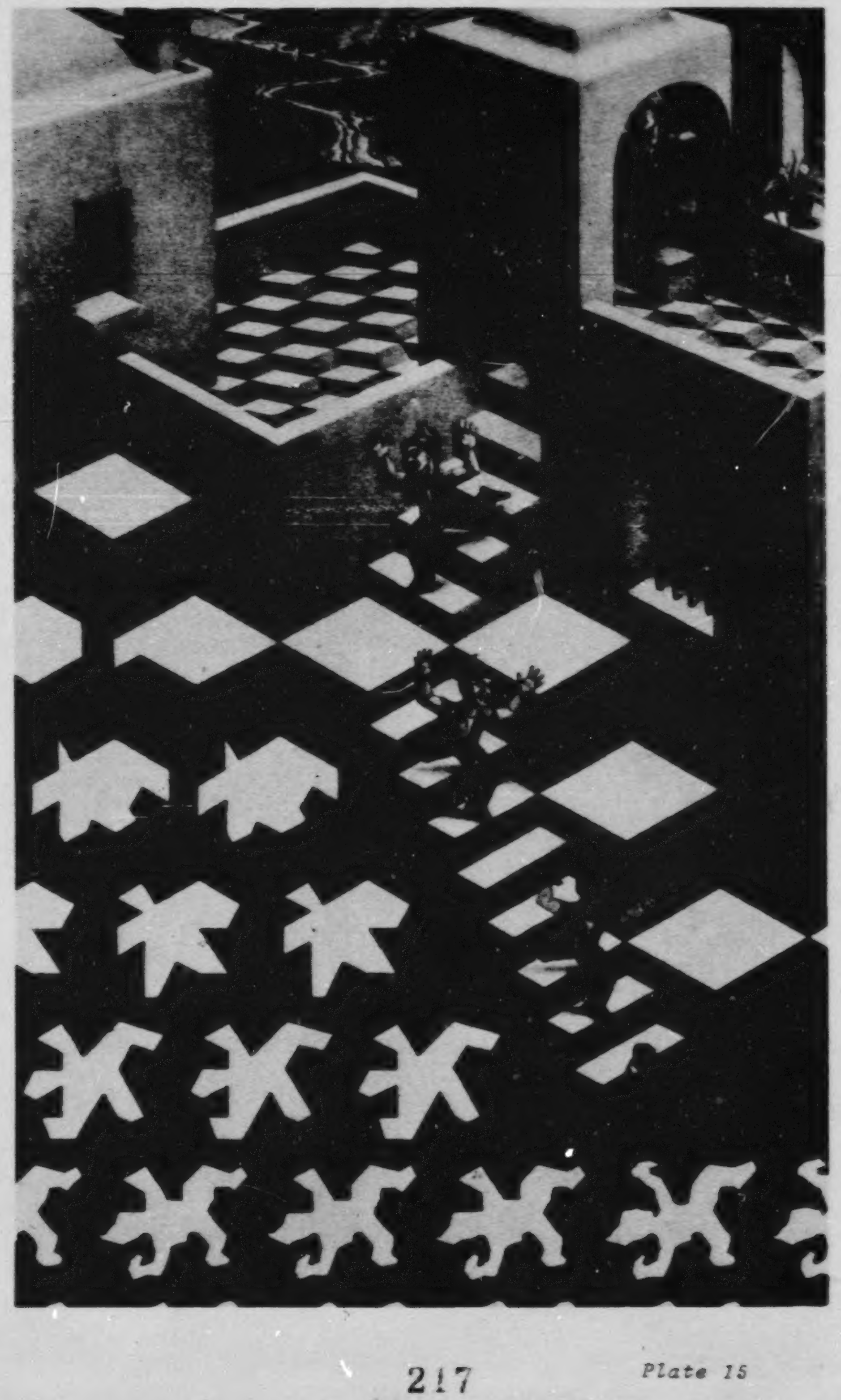

Plate 15

EGO MECHANISMS AND MARIHUANA USAGE

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The primary objective of this paper is to examine the relationship between marihuana usage and ego mechanisms of coping and defense. A secondary objective was to examine the relationship between marihuana usage and a number of variables concerned with discontent and maladaptive behavior. There have been a number of psychoanalytic theories of drug dependence (Knight, 1937; Schilder, 1941; Bergler, 1944; Rado, 1962; Blum, 1966: Krystal & Raskin, 1970). Although these theoretical formulations differ considerably in content, a common theme is that some form of early childhood deprivation results in inadequate development of ego mechanisms of defense and coping, and this lack of effective coping capacities is reflected later in life in maladaptive behavior. Drug abuse is viewed as a regressive response to the pain and anxiety evoked by inadequate role performance.

Those studies that have been concerned with specific ego mechanisms of coping and defense in the literature on alcohol addiction (Halpern, 1946; Button, 1956; Zwerling & Rosenbaum, 1959; Chodorkoff, 1964; Coopersmith, 1964; Lisansky, 1967; Gomberg, 1968; Rosenberg, 1969) and narcotic addiction (Zimmering, 1952; Ausubel, 1961; Bender, 1963; Rettig & Pasamanick, 1964; Krystal & Raskin, 1970) have been surprisingly consistent in finding the addict to be generally ego deficient, characterized by the absence of effective ego mechanisms of coping and defense, unable to tolerate frustration, and regressing to more primitive, less effective defenses when faced with stress. Alcoholics have also been found to have problems in impulse control (Billig & Sullivan, 1943; Halpern, 1946; Button, 1956; McCord & McCord, 1960; Jones, 1968; McClelland, Davis, Kalin, & Wanner, 1972).

A question that should be addressed by researchers concerned with the relationship of individual difference variables to psychoactive drug use is the extent to which users of these drugs display a pattern of ego defense and coping mechanisms similar to those patterns found to be characteristic of alcohol and narcotic drug addicts. The major focus of this paper is on marihuana usage. The drug dependency literature suggests a number of hypotheses about ego mechanisms of marihuana users. If heavy marihuana users are characterized by drug dependent personalities, then use of marihuana should be positively associated with use of regression as a characteristic ego defense and negatively associated with measures of adequate coping behavior. If marihuana users have difficulty in impulse control, we would expect them to be characterized by inadequate use of repression and projection.

Although there has been some evidence suggesting that users tend to be more vulnerable to frustration (Green, Blake, Carboy, & Zenhausenn, 1971) and more impulsive (Hogan, Mankin, Conway, & Fox, 1970), most of the research that has focused on personalities of marihuana users has found that either marihuana users did not differ significantly from controls on measures of psychopathology (Pearlman, 1968; McAree, Steffenhagen, & Zheutlin, 1969; Zinberg & Weil, 1970) or that marihuana users were more open to experience (Grossman, Goldstein, & Eisenman, 1971; Hogan, et al., 1970), less authoritarian (Grossman, et al., 1971), and less conventional (Suchman, 1968; Zinberg & Weil, 1970). Such findings suggest the hypothesis that the degree of marihuana use positively covaries with characteristic use of regression in service of the ego.

Five additional measures concerned with discontent and maladaptive behavior were also included in the present study. These were relative discontent (Cantril, 1965), locus of control (Rotter, 1966), a measure of maladjustment (Scheff, 1964), and the pure schizophrenia and pure paranoia subscales (Welsh, 1952) of the Minnesota Mutliphasic Personality Inventory (MMPI; Dahlstrom & Welsh, 1960). Both relative discontent and locus of control have been found to be associated with maladaptive and pathological behavior (for reviews see Kleiner & Parker, 1963; Rotter, 1966; Lefcourt, 1966; Lefcourt, 1972). These five measures were hypothesized to be unrelated to the degree of marihuana use.

METHOD

Subjects

The data used in this paper were collected as part of a larger study, the major purpose of which was to examine acute adverse reactions to marihuana and to LSD. The data were collected using a self-administered questionnaire, completed by 483 male subjects interested in drug use. Subjects were contacted through a system of chain referrals, and questionnaires were returned using a system which insured that responses were anonymous. Age was distributed in this sample with a mean of 21.4 and a standard deviation of 2.9; 95% of the subjects were white. Most subjects lived in the community surrounding a university, with approximately 65% reporting being students. Further details of the sampling technique and characteristics of this population have been described elsewhere (Naditch, 1974).

Measures

The study included a number of measures of drug usage, including separate measures of current frequency and cumulative historical use of marihuana, hashish, LSD, mescaline, oral and intravenous amphetamines, cocaine, and heroin. For purposes of this analysis, marihuana and hashish usage were combined, and the dependent variable measure consisted of the number of times subjects had used either marihuana or hashish.

Haan (1963, 1965) has developed a number of paper-and-pencil measures of defense and coping based on the Haan-Kroeber model (Kroeber, 1963) of ego functioning. These defense and coping measures use MMPI and CPI items, respectively, and were developed using clinical assessments of various ego mechanisms defined in the Haan-Kroeber model. Items which related to clinical assessments at the .01 level or greater for male subjects were used in this analysis.

Haan's measures of defensive regression, two measures concerned with impulsive control (repression and displacement) and two coping measures (total coping, a composite summation of all the coping mechanisms, and regression in service of the ego), were included in the larger study and were used to test the specific hypotheses that have been discussed. In addition, three additional defense mechanisms (denial, projection, and intellectualization) and two additional coping mechanisms (objectivity and tolerance of ambiguity) were included in the study. Although no specific hypotheses were made concerning these ego mechanisms, the relations between these measures and marihuana usage were also examined in an exploratory manner.

Relative discontent was measured using the Cantril Self-Anchoring Striving Scale (Cantril, 1965). This scale measures the disjuncture between a subject's real and ideal life situations along a 10-point scale. Locus of control was measured using Rotter's I-E Scale (Rotter, 1966). Maladjustment was measured using 19 items which differentiated patients at the University of Wisconsin Counseling Center from controls. Means and standard deviations of the distributions of all the independent variable measures for this sample have been reported elsewhere (Naditch, 1974; Naditch, in press).

Procedures

McAree, et al., (1969) found that while marihuana-only users did not have abnormal profiles on the MMPI, multiple drug users scored higher on a number of indices of psychopathology. A number of authors have reported finding LSD users to be higher in psychopathology than normals (Frosch, Robbins, & Stearn, 1965; Blumenfield & Glickman, 1967; McAree, et al., 1969; Smart & Jones, 1970). These findings suggest a problem for studies focusing on marihuana use. Many marihuana users use other psychoactive drugs as well. In this sample, for example, marihuana/hashish use (hereafter referred to as marihuana use) was strongly correlated with use of hallucinogens ($r=.71$, $p < .001$), oral amphetamines ($r=.58$, $p < .001$), and cocaine ($r=.43$, $p < .001$). Associations found between independent variables and marihuana use may reflect shared variance with other kinds of drug use. Consequently, in this analysis correlations and regression equations were examined, first using the total sample and second using the subsample of nonusers and marihuana-only users.

Pearson correlations were computed for each of the ego mechanisms and marihuana use, and stepwise multiple regression equations were computed. This procedure was repeated, calculating Pearson correlations between marihuana usage and the five additional independent variable measures of discontent and maladaptive behavior, and recalculating stepwise multiple regression equations including these additional independent variables for both the total sample, and the subsample of nonusers and users of only marihuana and hashish.

A discriminant function analysis was calculated in order to determine the extent to which the independent variables considered in this study differentiated nonuser and marihuana-only users from heavier drug users. Stepwise multiple regression equations were used to calculate the discriminant function analysis. This procedure is essentially equivalent to those computed using discriminant function analysis when the dependent variable has only two categories (Van de Geer, 1971, pp. 265-266). A dummy variable was created as a dependent variable from the two groups of subjects used in this analysis. This variable was assigned a value of zero, for those subjects who had either used no psychoactive drugs or had used only marihuana or hashish, or of one for the subjects who had used LSD, mescaline, cocaine, amphetamines, or heroin. Of the people in the latter category, 100% reported having ever used marihuana, 76.6% had used marihuana more than 100 times, 76% had used LSD, 81.6% had used mescaline or peyote, 75.7% had used oral amphetamines, 42.1% had used cocaine, and 9.1% had used heroin. Zero-order correlations were calculated for this dummy variable, each of the ego mechanisms, and the five additional individual difference variables considered in this analysis, and two stepwise multiple regression equations were computed. One regression equation used the ego mechanisms as independent variables, and the second equation included the ego mechanisms as well as the five additional individual difference variables.

RESULTS

Ego Mechanisms and Marihuana Use

Zero-order correlations and stepwise multiple regression equations of the ego mechanisms, considered in this analysis with marihuana usage and with marihuana usage in the subsample of marihuana-only users, appears in Table 1.

The zero-order correlations computed on the basis of the entire sample suggest some support both for the ego deficiency and the openness-to-experience hypotheses. The degree of marihuana usage was positively correlated with defensive regression ($r=.20$, $p < .001$) and negatively correlated with total coping ($r=-.18$, $p < .001$). There was no relationship between marihuana usage and repression or displacement, failing to support the hypothesis that marihuana users would have problems in impulse control. The strongest zero-order correlation was between regression in service of the ego and marihuana usage ($r=.26$, $p < .001$), supporting that hypothesis.

There was a smaller but statistically significant negative zero-order correlation between denial and marihuana use ($r=-.16$, $p < .001$). However, this association should be interpreted with caution because high deniers may also be less likely to admit using

Table 1

Zero-order correlations and multiple regression equations of the effects of ego mechanisms on marihuana use for the total sample and for nonusers and users of only marihuana

Independent variables	Marihuana/hashish use							
	Total sample				Drug nonusers and users of only marihuana/hashish			
	r	B	F	R2 Chg	r	B	F	R2 Chg
Regression in the service of the ego	.26***	.29***	36.7	.07	.24**	.24*	8.0	.06
Total Coping	-.18***	-.17**	10.0	.06	.02			
Denial	-.16**	-.10*	4.5	.01	-.16			
Regression	.20***	.11*	3.9	.01	.07			
Repression	.04				.10			
Displacement	.02				-.02			
Projection	.08				-.05			
Intellectualization	-.01				.05			
Objectivity	-.03				.12			
Tolerance of ambiguity	-.01				.08			
R^2				.15				.06
d.f.	1/482				1/135			

Where: B = standardized regression coefficient (Beta)
F = F statistic calculated for standardized regression coefficient
r = Zero-order correlation; R^2 = the squared multiple correlation

* $p < .05$; ** $p < .01$; *** $p < .001$ Significance levels based on two-tailed test

psychoactive drugs. There were no significant zero-order correlations between defensive projection, intellectualization, the coping mechanisms of objectivity or tolerance of ambiguity, and marihuana use in this sample.

The stepwise multiple regression equation calculated on the basis of the total sample indicates that each of the ego mechanisms which had significant zero-order correlations with the degree of marihuana usage also made significant independent contributions to the variance. Regression in the service of the ego was the most important ego mechanism in predicting use (B=.29, F=36.7, $p < .001$) and accounted for 7% of the variance in marihuana use. Total coping also made an independent contribution to the variance (B=-.17, F=10.0, $p < .01$), accounting for approximately 6% of the variance. Regression (B=.11, F=3.9, $P < .05$) and denial (B=-.10, F=4.5, $p < .05$) also made independent contributions, although the effects of these variables were smaller because of shared variance with the other significant ego mechanisms.

In order to determine the extent to which relationships between ego mechanisms and marihuana use may have been due to shared variance with other kinds of psychoactive drug usage, the zero-order correlations and the regression equations were recalculated using as a subsample those subjects who had either never used any psychoactive drugs or who used only marihuana or hashish. The results in Table 1 indicate no support for the ego deficit addiction hypothesis when only nonusers and marihuana users were considered. There were no significant zero-order correlations for either regression (r=.07, ns), total coping (r=.02, ns), or denial (r=-.16,ns). The only variable making a significant contribution to the variance in marihuana usage was regression in service of the ego (B=.24, F=8.0, $p < .05$). As a further check on the validity of these results, partial correlations between each of the ego mechanisms and marihuana usage, partialling out for the effects of LSD use, were calculated. Those results were consistent with the results in Table 1. The significant zero-order correlations between marihuana usage and regression failed to reach statistically significant levels. Partial correlations between marihuana usage and regression in the service of the ego (r=.16, $p < .001$) and denial (r=-.13, $p < .01$), partialling out for the effects of LSD usage, remained statistically significant.

Other Independent Variables and Marihuana Use

The relationship between the five additional individual difference variables in these data and marihuana usage was examined by calculating zero-order correlations between each of these variables and marihuana use, for the total sample and for the subsample of marihuana-only users, and by recalculating the stepwise multiple regression equations including these five additional variables in the independent variable pool together with the ego mechanisms. The results are shown in Table 2.

Using the total sample, marihuana usage was positively correlated with locus of control (scored towards externality, r=.17, $p < .001$) and with the pure schizophrenia subscale of the MMPI (r=.10, $p < .05$), and it was negatively correlated with the pure paranoia subscale (r=-.12, $p < .05$) of the MMPI. When a stepwise multiple regression was recalculated including these new independent variables, regression in service of the ego (B=.29, F=34.3, $p < .001$), total coping (B=-.22, F=18.9, $p < .001$), and denial (B=-.12, F=5.6, $p < .05$) continued to make independent contributions to the variance although regression did not. The pure paranoia subscale of the MMPI was negatively related to marihuana usage (B=-.12, F=7.0, $p < .05$) and made an independent contribution to the variance. Locus of control and the pure schizophrenia subscale of the MMPI failed to make independent contributions.

When the subsample of subjects who had never used psychoactive drugs other than marihuana or hashish was considered, the zero-order correlations between degree of marihuana use and locus of control (r=.10, ns) and the pure schizophrenia subscale of the MMPI (r=.07, ns) failed to reach statistical significance. The zero-order correlation between the pure paranoia subscale of the MMPI and marihuana usage was statistically significant and of a larger magnitude (r=-.23, $p < .01$) in the marihuana-only subsample. When the stepwise multiple regression equation was recomputed including all the five

Table 2

Zero-order correlations and multiple regression equations of the effects of ego mechanisms and other personality variables on marihuana use for the total sample and for nonusers and users of only marihuana

Independent variables	Marihuana/hashish use							
	Total sample				Drug nonusers and users of only marihuana/hashish			
	r	B	F	R^2 Chg	r	B	F	R^2 Chg
Regression in the service of the ego		.29***	34.3	.06		.24*	8.8	.06
Total Coping		-.22***	18.9	.05				
Denial		-.12*	5.6	.01				
Regression								
Paranoia (Pa')	-.12*	-.12*	7.0	.02	-.23**	-.24*	8.6	.06
Schizophrenia (Sc')	.10*				.07			
Locus of control	.17***				.10			
Maladjustment	.05				-.04			
Discontent	.06				.08			
R^2				.14				.12
d.f.	1/482				1/135			

Where: B = standardized regression coefficient (Beta)
F = F statistic calculated for standardized regression coefficient
r = Zero-order correlation; R^2 = the squared multiple correlation

* $p < .05$; ** $p < .01$; *** $p < .001$ Significance levels based on a two-tailed test

additional independent variables and all the ego mechanisms considered, paranoia made a significant independent contribution to the variance (B=-.24, F=8.6, $p < .05$) in addition to the contribution made by regression in the service of the ego (B=.24, F=8.8, $p < .05$). These calculations indicated that schizophrenia, locus of control, maladjustment, and discontent were not significantly related to marihuana usage in the population of marihuana-only users and did not make independent contributions to the variance in the total population. The negative relationship between paranoia and marihuana usage is difficult to interpret because it may reflect response bias. Subjects characterized by a paranoid style would be expected to be more suspicious about the purposes of the study and, even though responses were anonymous, they may have been less likely to admit using marihuana. It cannot be determined from these data whether or not paranoid tendencies are associated with lower rates of marihuana usage or whether response bias accounts for reported lower levels of usage.

The Discriminant Function Analysis

The differences found between the marihuana-using and nonusing subjects and the subjects using other types of illicit drugs suggest that it would be useful to examine the differences between the two groups as a function of the independent variables considered in this analysis. The results of a discriminant function analysis provide the best predictor, given the variables in this analysis, of which subjects who are nonusers or marihuana/hashish-only users would be most likely to experiment with use of more potent and possibly more harmful types of illicit drugs.

The results of this analysis appear in Table 3.

Four of the ego mechanisms made significant, independent contributions to the variance. In the order they entered the equation, these were regression (B=.12, F=4.3, $p < .05$), regression in service of the ego (B=.26, F=24.6, $p < .001$), total coping (B=-.19, F=11.4, $p < .001$), and denial (B=.10, F=4.2, $p < .05$). Most of the variance was accounted for by regression (R^2chg=.05), regression in the service of the ego (R^2chg.=.05), and denial (R^2chg.=.03). When five additional individual difference variables were also included in the analysis, the prediction equation was essentially the same, with only one exception. Locus of control (B=.10, F=4.3, $p < .05$) made a small but significant independent contribution to the variance and denial did not. These results indicate that some of the characteristics hypothesized to be related to the drug dependent personality, such as poor total coping and characteristic use of defensive regression, although not significant predictors of marihuana usage, were significant predictors of those characteristics differentiating marihuana users from users of more potent drugs. Regression in the service of the ego was the strongest predictor of all the variables considered.

A discriminant function analysis between nonusers and marihuana users was also calculated. Regression in the service of the ego (B=.20, F=5.6, $p < .05$) was the only variable to make a significant and independent contribution to the variance (R^2chg.=.04)

DISCUSSION

Ego Mechanisms and Marihuana Use

In this study marihuana users were not found to share the configuration of ego mechanisms of defense and coping that have been associated with alcohol and narcotics addiction. There was no evidence that the degree of marihuana use itself was associated with inadequate coping, characteristic use of defensive regression, or lack of impulse control because of an inability to effectively use repression or displacement. The degree of marihuana use was significantly associated with characteristic employment of regression in the service of the ego as a coping mechanism. This finding is consistent with those studies of marihuana users that have found them to be more open to experience (Suchman, 1968; Hogan, et al., 1970; Grossman, et al., 1971; Zinberg & Weil, 1970) than nonusers. Examination of five additional variables related to discontent and maladaptive behavior (locus of control, discontent, maladjustment, schizophrenia, and paranoia) did not find

Table 3

Discriminant function analysis of characteristics differentiating marihuana users from users of more potent illicit drugs

Independent variables	Dummy variable[1]						
	Ego mechanisms				All independent variables		
	r	B	F	R^2 Chg	B	F	R^2 Chg
Regression	.22***	.12*	4.3	.05	.12*	4.6	.05
Regression in the service of the ego	.21***	.26***	24.6	.05	.25***	24.4	.05
Total coping	.21***	-.19***	11.4	.03	-.19***	10.8	.03
Denial	.16**	.10*	4.2	.01			
Locus of control	.16**				.10*	4.3	01
R^2				.14			.14
d.f.	1/482				1/482		

[1] Dummy variable = 0 for nonusers and marihuana-only users
= 1 for users of other psychoactive drugs

Where: B = standardized regression coefficient (Beta)
F = F statistic calculated for standardized regression coefficient
r = Zero-order correlation; R^2 = the squared multiple correlation

* $p < .05$; ** $p < .01$; *** $p < .001$ Significance levels based on a two-tailed test

any evidence that marihuana use was associated with these maladaptive behaviors. There was a negative relationship found between the degree of paranoia and marihuana use, but it could not be determined from these data whether this association indicated that paranoid subjects were less likely to report using marihuana or less likely actually to use it. These results are consistent with the findings of other authors who have failed to find associations between marihuana usage and psychopathology.

These results indicate that using the variables in this study, the best estimator of which nonusing subjects would most likely use marihuana, the degree of marihuana use,and which subjects using marihuana would be most likely to use harder drugs,was characteristic use of regression in the service of the ego as an ego mechanism. Although harder-drug users shared this charactertistic with marihuana users, harder-drug users were more likely to also have poorer total coping and were more likely to use defensive regression than were marihuana users.

Problems in Definition of the Dependent Variable in Research on Psychoactive Drug Use

It was clear in this study that associations found between the degree of marihuana use and some independent variables were a function of shared variance with the degree of use of more potent forms of psychoactive drugs. Associations found between marihuana use and other independent variables may be misleading if use of marihuana is not distinguished from other patterns of multiple drug use. The methodological solution in this study was acceptable because the major focus of this report is on marihuana use. Nevertheless the problem of definition of multiple drug use does not lend itself to totally satisfactory solutions. A major task awaiting us is to have researchers in the field attempt to standardize their measures and concepts so that research in this area may have some cumulative value. The most important construct to be defined and operationalized in this area is the dependent variable itself.

In order for research to be cumulative in this area there must be some agreement about how to define more complex patterns of drug use, and there is beginning to be some focus on this problem in the research literature on drug usage(Scherer, Ettinger & Murdick,1972; Kahn & Holroyd, 1973). Scherer, et al., (1972) divided their subjects into nonusers, soft-drug users, and hard-drug users. In a recent study Holroyd and Kahn (in press) divided their subjects into seven categories, one for nonusers, two for moderate users, and four for heavy users of illicit drugs. Although these studies represent an important step in differentiating complex patterns of drug use, they raise important unsolved problems. In the Holroyd and Kahn study, for example, the authors present a comparison of means of the nonuser, moderate user, and heavy user groups. Heavy use was defined as either heavy use of marihuana or reported use of hallucinogens, mood elevators, depressants, or opiates. The results being reported here suggest the functional equivalence of heavy marihuana use with use of hallucinogens and potentially more harmful drugs should be a question decided by an empirical comparison of heavy marihuana users with hallucinogen users in a particular study rather than by arbitrary classification.

The Discriminant Function Analysis and the Importance of Multivariate Techniques in Research on Psychoactive Drugs

The discriminant function analysis comparing nonusers and users of only marihuana or hashish to users of other illicit drugs found some support for both the ego deficiency hypothesis suggested by research in alcohol and narcotic drug addition studies and the hypothesis that marihuana use was positively associated with characteristic use of regression in the service of the ego, a characteristic usually associated with creativity and psychological health. Most research in psychology has a tendency to define and explain behavior in terms of bipolar traits that have connotations of either good (creative, open to experience) or bad (ego deficient).

The results of this study present a somewhat more complex picture of the characteristic ego mechanisms of subjects likely to experiment with more potent illicit drugs than marihuana or hashish. These subjects, while characteristically using regression in the service of the ego, also have a tendency to use primitive defense and coping mechanisms when faced with stress, as indicated by their characteristic use of regression and low scores on total coping. These subjects were also more likely to have an external locus of control, and research on that construct has almost exclusively associated externality with maladaptive behavior and pathology. These results are not inconsistent with the theoretical framework used to describe ego functioning in the Haan-Kroeber model. These authors (Kroeber, 1963; Haan, 1966) maintain that coping and defense mechanisms (even a pair describing the proactive and reactive aspects of characteristic use of the same dimension, time reversal or regression) may vary independently. People can be high on both defensive reactive regression,and also characteristically use regression in an adaptive proactive manner in the form of regression in the service of the ego.

Although there was some support found for a number of hypotheses in this study, the discriminant function analysis accounted for only 14% of the variance between the two groups, and the association between regression in the service of the ego and marihuana usage accounted for only 6% of the variance in marihuana usage rates. These findings suggest the importance of multicausal, nonreductionistic explanations of complex social behavior. Studies of illicit drug use should include individual difference variables, psychosocial, and sociological variables in the same analysis. This more comprehensive approach is a necessary prerequisite for the development of causal theory and understanding in this area. Variables at all three levels of analysis in the same research would facilitate the use of multivariate techniques and allow researchers not only to answer questions about the relative importance and independence of contributions at all three levels of analysis but also to investigate possible complex interaction effects.

A Final Note on Limitations of the Generalizability of Research on Marihuana Use and the Diffusion of Innovations

Research on the diffusion of innovations in rural sociology and medicine (Rogers, 1962; Rogers & Shoemaker, 1971) suggests that new ideas, whether they are of hybrid corn seed or a medical drug discovery, have a similar pattern of diffusion through a society. The innovators, early adopters, early majority, late majority, and laggards in accepting and adopting these new innovations have identifiable sociological and psychological characteristics (Rogers, 1962). Marihuana users have been found to be more open to experience and more independent, as well as more alienated (Keniston, 1965; Harris, 1971), than nonusers. These characteristics are similar to the characteristics that have been associated with innovators in diffusion research (Rogers, 1962). If use of illicit psychoactive drugs is considered as an innovation, diffusion research suggests that as psychological and sociological characteristics associated with use subject to change. This perspective underlines the importance of taking into account the period of time during which the data was collected as well as characteristics of various samples in interpreting the meaning of cumulative research findings in this area.

The results in this study are limited in their generalizability because the sample was composed exclusively of male, adolescent, primarily white subjects, who participated in this study during the spring and summer of 1972.

SUMMARY

The relationship between marihuana usage and ego mechanisms of coping and defense was examined. There was no evidence that subjects who used only marihuana or hashish had patterns of ego deficiency that have been associated with narcotic and alcohol addiction. Marihuana use was positively associated with characteristic use of regression in service of the ego. A discriminant function analysis of the difference between marihuana users and users of more potent illicit drugs found in the latter group evidence of ego deficiency, regressive tendencies, and low scores on total coping, as well as characteristic use of regression in service of the ego.

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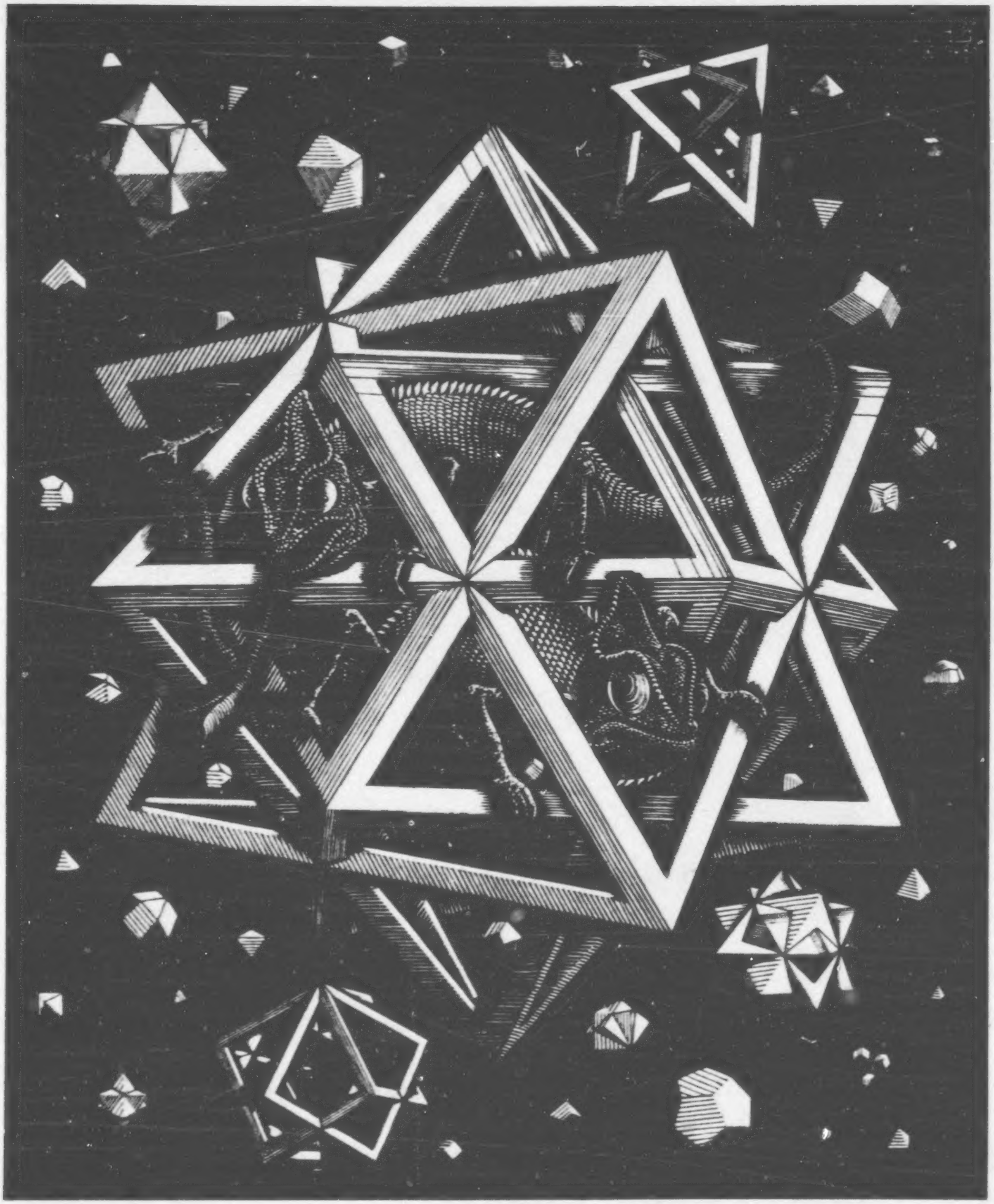

Plate 1

CHEMICAL SUBSTANCE ABUSE AND PERCEIVED LOCUS OF CONTROL

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PURPOSE OF THE PAPER

The intent of the present paper is to consider the possible relevance of the locus of control construct to the understanding of persons who abuse or who may be at serious risk to abuse alcohol, opiates, amphetamines, barbiturates, cannabis, and other chemical substances. Locus of control has intrigued many behavioral scientists engaged in building general theories of human behavior and has generated a great deal of research. Thus, although these scientists are still in the process of evaluating the construct and of sharpening tools for its measurement, it is tempting to hope that locus of control might prove useful for discriminating potential abusers, characterizing the progression from use to abuse, describing confirmed abusers, or matching abusers more effectively with available treatment modalities.

As Rotter cautioned in 1966 and Lefcourt again emphasized six years later, locus of control is "but one element of a behavioral prediction formula...when research is presented focusing on locus of control as a sole predictor of a given set of criteria, it necessarily represents a limited approach...such that high magnitude relationships should not be anticipated" (Lefcourt, 1972, p. 2). This is not to say, however, that locus of control might not contribute significantly to multivariate prediction of substance-abusing behaviors. In an area such as substance abuse which is plagued by theoretical dissension, poor methodology, and failure to coordinate and integrate findings (Braucht, Brakarsh, Follingstad, and Berry, 1973), any factor which can consistently account for even some very limited fraction of the variance may be helpful.

PLAN OF THE PAPER

This paper will begin with a brief description of the locus of control construct and of the instrument, the I-E scale, which is most often used to measure it. Next, the results of several studies will be noted. These are grouped according to whether the subjects were drawn from presumably normal populations, from populations of psychiatric patients, or from populations of chemical substance abusers as distinct from psychiatric patients. Studies of normals and psychiatric patients other than alcoholics or opiate addicts are included to provide a context for considering the latter and also because the latter were undoubtedly for some portion of their lives members in good standing of the former.

The literature on locus of control is vast and cannot possibly be encompassed here, while the literature on locus of control and substance abuse is quite limited. The paper will include some previously unreported data on locus of control in black and white male and female heroin addicts in methadone maintenance programs and will offer some thoughts on the apparent utility of locus of control for predicting/explaining substance abuse.

THE LOCUS OF CONTROL CONSTRUCT

The construct of perceived locus of control is derived from Julian Rotter's social learning theory, which hypothesizes that choice behavior is a function not only of the value of the reinforcement available in a situation and of situation-specific expectancies of reinforcement but also of the individual's "generalized expectancy" that the reinforcements he receives in life do or do not depend upon himself. Individuals who, on the whole, expect their own behavior or attributes to determine what happens to them are said to have an "internal" locus of control, while individuals who believe that fate, chance, powerful others, or complex outside forces determine what happens to them are said to have an "external" locus of control. It is not implied, however, that locus of control is dichotomous; rather, individuals may fall anywhere on an internal-external continuum (Rotter, 1966).

Intuitively, perceived locus of control is attractive as a variable helping to account for behavior, and there now exists a considerable body of evidence generally supporting the validity of the construct. Reynolds (1973), for example, concluded on the basis of an extensive literature review that "locus of control, whether defined situationally or as a personality dimension, is an important construct...people do seem to behave differently depending on whether or not they believe they themselves are capable of delivering valued reinforcements" (p. 102).

Rotter and others have recognized that locus of control may be related to or may in part overlap certain other constructs such as alienation, powerlessness, inner/outer directedness, field dependence/independence, need for achievement, ego control, introversion/ extroversion, and others. Collins, Martin, and Ashmore (1973) offered a useful, brief discussion of the "internal-external metaphor in theories of personality" as well as some research evidence bearing on the question: "Are the Reisman outer-directeds, the Rotter externals, the Schacter fats, the external attributors, and the Eysenck extroverts the same people?" (p. 477). In general, however, the nature of the relationship among various concepts and measures of internality-externality requires further exploration.

THE I-E SCALE

The Internal-External (I-E) Scale was developed by Rotter and his co-workers as a forced-choice, self-report, paper-and-pencil instrument to measure individuals' generalized expectancies about locus of control. While a number of other measures have been utilized by various researchers (Dean, 1961; Bialer, 1961; Crandall, Katkovsky, & Preston, 1962; Battle & Rotter, 1963; Dies, 1968; Harrison, 1968; Gurin, Gurin, Lao, & Beattie, 1969; Schneider, 1968; Lessing, 1969; Nowicki, 1975), the I-E Scale has been the most popular. The Scale is reported by Rotter (1966) to have acceptable reliability and discriminant validity. Also, it is conveniently brief (23 items, plus six filler items) and easily administered.

Despite such advantages, the I-E has been criticized on a number of counts; in particular, on the grounds that answers are contaminated by social desirability or mood and that two or more distinct types of expectancy are tapped.

In regard to the social desirability issue, Reynolds, after considering the evidence presented by Joe (1972), Hjelle (1971), and others, concluded that abandoning the I-E as hopelessly infected with a social desirability factor would be premature (Reynolds, 1973). The data of Nowicki and Walker (1973) indicate that other measures of locus of control (in their study, the Nowicki-Strickland Personal Reaction Survey for Children) are not immune to social desirability effects. According to Lamont and his colleagues (Lamont, 1972; Lamont & Brooks, 1973), responses to the I-E may be heavily affected also by the mood of the respondent, regardless of I-E content. These authors are concerned that inflated scores may be produced by depressed mood.

In regard to the multidimensionality issue, Mirels argued that the expectancy that one will be able to manage the course of his own life should be distinguished from the expectancy that one will be able to have an impact on social institutions; in Mirel's view, the I-E contains items measuring both these expectancy factors and might better be broken down into two subscales (Mirels, 1970). Kleiber, Veldman, and Menaker (1973), using a modified version of the Scale, found it to yield three dimensions: nonbelief in luck and chance, system modifiability, and individual responsibility for failure. Reid & Ware (1974) has also discussed three dimensions which they label self-control, fatalism, and social system control. On the other hand, Steger, Simmons, and Lavelle (1973) believe that "there is little to be gained by attempting to subdivide the present I-E Scale," and Reynolds (1973) cautions against "the trend toward dissipation of generalized locus of control measures into a myriad of more specific variables" (p. 87). Joe and Jahn (1973), although they identified two factors in the Scale, did not conclude that their results warranted the creation of subscales. They suggested, however, that the I-E could be improved through the use of a 6-point response format which could permit assessment of degrees of belief in internality-externality.

In short, it seems clear that the last word has not yet been spoken in the literature about the factorial composition of the I-E or the contamination of responses by social desirability or mood. Still another question is whether the I-E is best understood as measuring state, trait, or both. Indeed, the susceptibility of the I-E to situational factors is a growing concern of researchers in the area and will be mentioned again in this review.

STUDIES OF NORMAL POPULATIONS

General Characteristics Associated With Locus of Control

Despite inconsistencies and contradictions among studies, research evidence accumulated to date strongly suggests that distinctive clusters of traits, attitudes, and behaviors tend to be associated with internal and external locus of control orientations. Thus, the bulk of present data indicates that persons characterized as internals by locus of control scores are more likely than externals to perceive the environment as manipulatable, to see themselves as personally responsible for outcomes in their own lives, and to prefer activities involving skilled rather than chance performance (Rotter & Mulry, 1965; Watson & Baumal, 1967; Lefcourt, Lewis & Silverman, 1968; Schneider, 1968; Krovetz, 1974).

Internals compared to externals may more actively seek to understand and control their surroundings and themselves. This general tendency has been shown to manifest itself in such diverse areas as political/social activism (Gore & Rotter, 1963; Strickland, 1965; Forward & Williams, 1970; Beckman, 1972; Ryckman, Martens, Rodda, & Sherman, 1972); church membership (Schrauger & Silverman, 1971); scanning the environment for information and utilization of information (Seeman & Evans, 1972; Seeman, 1963; Phares, Ritchie & Davis, 1968; Lefcourt & Wine, 1969; Lefcourt & Telegdi, 1971; Williams & Stack, 1972); smoking behaviors (Straits & Sechrest, 1963; James, Woodruff & Werner, 1965; Platt, 1969); using contraceptives (Lundy, 1972; MacDonald, 1970); reactions to humor cues (Lefcourt, Sordoni, & Sordoni, 1974); assuming task leadership roles (DeBolt, Liska, Love, & Stahlman, 1973); and choosing to delay gratification (Strickland, 1972; Walls & Smith, 1970).

Consistent with the picture of internals as more active, purposeful, and vigilant doers than externals is evidence describing internals as more independent, less conforming, and susceptible to persuasion themselves but more effective in persuading others and preferring to rely on their own skills and judgments, even when this may be counterproductive (Crowne & Liverant, 1963; Phares, 1965; Julian & Katz, 1968; Ritchie & Phares, 1969; Lefcourt & Wine, 1969; Rothschild & Horowitz, 1970; Doctor, 1971; Biondo & MacDonald, 1971; Tolor, 1971; Ryckman & Sherman, 1974).

Positive correlations between the I-E Scale (where high scores reflect externality) and measures of social desirability also imply that internals are less conforming than externals. A recently reported cross-cultural study by McGinnies and Ward (1974) indicated that the nature of the relationship between internality-externality and persuasability may vary from country to country.

Goodstad and Hjelle (1973) offered evidence that internals were more likely to rely on personal powers of persuasion (giving encouragement, praise, admonishment, and setting new standards) and externals on coercive tactics (use of threats and penalties) while engaged in a (fictitious) supervisory task in which they had to deal with inept and negativistic "workers." These authors suggested that externals may be more likely to resort to coercion since they feel themselves to be psychologically powerless.

Precisely how and under what conditions internals may differ from externals in cautiousness or risk-taking behavior remains obscure and controversial (Liverant and Scodel, 1960; Lefcourt, 1965; Julian, Lichtman and Ryckman, 1968; Baron, 1968; Minton and Miller, 1970; Lefcourt and Steffy, 1970).

In addition, reports are contradictory and, in general, discouraging of the relationship between locus of control and achievement motivation or academic performance (Crandall, Katkovsky, & Preston, 1962; Mehrabian, 1968; Gold, 1968; Wolk & DuCette 1971; Nowicki & Roundtree, 1971; Nowicki & Walker, 1973; Reynolds, 1973).

Recent efforts to relate locus of control to self-reinforcement also have had only varying success (Bellack, 1972; Hall, 1973; Heaton & Duerfeldt, 1973).

Measures of Adjustment and Locus of Control

On the whole, the results of research concerned with the adjustment or mental health of normals indicate that internality is associated with personality traits, feeling states, and behaviors generally regarded as adaptive and desirable, while externality is associated with personality traits, feeling states, and behaviors generally regarded as comparatively maladaptive and undesirable. Irrespective of whether focus is on specific attributes or more global constructs such as "adjustment," it is commonly the external who gets the bad end of the continuum. Unfortunately, not all studies concur in the subject scores designated as "internal" or "external" and, in some, scores are split at the median, while in others only the extremes of the distribution are used.

One well-known study of adjustment in college students is that of Hersch and Scheibe (1967). Using a variety of measures, these authors concluded that the adjustment of internals is superior to that of externals. Internals scored more highly than externals on the Dominance, Tolerance, Good Impression, Sociability, Intellectual Efficiency, Achievement via Conformance, and Well-Being scales of the California Personality Inventory (CPI). Somewhat lower but still statistically significant associations were found between internality and still other CPI scales. As measured by the Pt scale of the MMPI, external subjects were found to be more anxious.

On the Adjective Checklist scales, results were consistent with those for the CPI. A comparison of the most extreme internal and external subjects further revealed that externals significantly more often described themselves as self-pitying, while internals significantly more often described themselves as clever, efficient, egotistical, enthusiastic, independent, self-confident, ambitious, assertive, boastful, conceited, conscientious, deliberate, persevering, clear-thinking, dependable, determined, hardheaded, industrious, ingenious, insightful, organized, reasonable, and stubborn. Only a few of these adjectives have negative connotations, and none is so damning in Protestant ethic terms as "self-pitying."

In addition to the findings noted above, Hersch and Scheibe (1967) reported that scores on a work effectiveness measure derived from peer and supervisor ratings characterized internal subjects as more effective than external ones. Similar results that internals are more proficient at and satisfied with their jobs have been reported by Tseng (1970) for a sample of vocational rehabilitation clients and by Heisler (1974) for a sample of government employees.

Duke and Nowicki (1973), using a smaller sample and a different locus of control measure (the adult Nowicki-Strickland Locus of Control Scale), partially replicated Hersch and Scheibe's Adjective Checklist findings. Duke and Nowicki found internality to be associated with the ACL Achievement, Dominance, Intraception, and Affiliation scales and externality to be associated with the Succorance and Abasement scales. Other results, although not statistically significant, were in the same direction as the Hersch and Scheibe findings.

According to DuCette and Wolk (1972), externals may typically be more deviant or extreme in their behavior. In their study of task persistence, shifts in level of aspiration, and risk-taking behavior of female students, some support for such a characterization was found. Feather (1967) found that externals of both sexes were likely to have more neurotic symptoms.

Since mental health or adjustment is sometimes defined in terms of self-actualization, Warehime and Foulds (1971) predicted that internal scores on the I-E would be positively associated with scores on the Personal Orientation Inventory which yields 12 scores reflecting various aspects of self-actualization. Their hypothesis was more strongly supported for female than for male students. For females, eight of the 12 scales were significantly related to internality, while for males only three scales were significantly related. In interpreting their results, the authors speculated that the Personal Orientation Inventory may tap a type of adjustment more valued by females than males.

Positive Affect, Self-Esteem, and Negative Affect

In another study, Warehime and Woodson (1971) administered the I-E and the Personal Feelings Scale to a sizeable sample of undergraduate students. Possible social desirability effects as measured by the Marlowe-Crowne and Edwards Scales were partialled out. For subjects of both sexes, internality was found to be correlated with positive affect. The type of Personal Feelings Scale item which contributed to positive affect, however, differed for the sexes. For males, internality was related to feelings of personal freedom, work satisfaction, feelings of alertness and clarity of thought, self-acceptance, and self-confidence. For females, internality related to global feelings of satisfaction and cheerfulness and to calmness and freedom from anxiety and depression.

Warehime and Woodson (1971) observed that positive affect in males, but not females, was associated with instrumental activity and accordingly suggested that "males and females may feel that they have general control over their reinforcements for different reasons... alternatively, internally-oriented persons may experience more positive affect than externals because what internals value most is perceived to be under their control" (p. 444).

Not only is positive affect associated with internality, but so apparently is high self-esteem. Using a feelings-of-inadequacy measure developed by Janis and Field, both Fish and Karabenick (1971) and Ryckman and Sherman (1973) found a relationship between high self-esteem and internal locus of control. These findings were in contrast to the failure of Platt, Eisenmann, and Darbes (1970) to find any significant association between I-E scores and a measure of self-esteem devised by Ziller.

Organ (1973) tested a prediction derived from attribution theory that the more external an individual, the less certain he would be about his self-concept. Even with self-esteem held constant, externality and ambiguity of the self-concept were related in a sample of students and a sample of adult male employees of a large corporation.

Heaton and Duerfeldt (1973) offered evidence that locus of control, self-esteem, and self-reinforcement may be facets of a more global personality construct or response tendency of individuals which they believe might more accurately predict behavior than any of these variables taken singly.

If internals compared to externals are likely to hold themselves in high regard and to experience positive affect, it follows that measures of anxiety, depression, and other unpleasant subjective states should be related to externality in the normal population. This seems to be quite well documented in studies concerned with several types of anxiety.

In the area of test anxiety, Butterfield's (1964) finding that externality was positively correlated with debilitating anxiety and negatively correlated with facilitating anxiety, as measured by the Alpert-Haber Facilitating-Debilitating Test Anxiety Questionnaire, was confirmed by Watson (1967) who tested a sample of well over 600 students. Watson also found that external locus of control and scores on the Taylor Manifest Anxiety Scale were positively related for both males and females. Ray and Katahn (1968) reported significant positive correlations between Taylor Manifest Anxiety Scale scores and externality in two large college student samples. In addition, externality was related to greater fear of academic failure as measured by the Mandler Test Anxiety Questionnaire.

Fear of succeeding rather than anxiety over failing a test was investigated by Midgley and Abrams (1974). Using Horner's (1969) incomplete story of a female at the top of her medical school class, these researchers asked internal and external female subjects to finish the story. Here, high anxiety over achievement (fear of success) was associated with externality.

MacDonald and Hall (1969, and 1971) hypothesized that external college students would feel more anxious and threatened than internals by the thought of physical disabilities of various kinds and that internals would be more threatened by thoughts of emotional disabilities. More support was found for the former than for the latter hypothesis. In a related 1971 paper, MacDonald suggested that locus of control may have promise as a variable influencing the rehabilitation of disabled persons.

Another study by Watson, this time with Baumal, tested the hypothesis that anxiety, inferred from impaired performance, is greater in situations incongruent with the subject's locus of control, whether external or internal. Female students with extreme external or internal orientations learned lists of paired-associate nonsense syllables under one of two sets of instructions, viz., that skilled performance would enable them to avoid shock or that shock would be randomly administered. Under the random shock instructions, internals made more errors; while under the skill instructions, externals made more errors. In addition, there was a trend, approaching statistical significance, for internals to take fewer trials to reach criterion under the congruent skill condition and for externals to require fewer trials under the congruent random or chance condition (Watson and Baumal, 1967). Siegel and Mayfield (1973) found that under failure conditions on an angle-matching task, externals reported less anxiety than internals, presumably because internals take personal responsibility for their failures, while externals attribute failure to causes outside themselves.

Tolor and LeBlanc (1971) reported that external subjects experience greater alienation as measured by the Manifest Alienation Measure. Apparently, externality was positively associated also with anxiety, hostility, and depressive affect as measured by the Multiple Affect Adjective Checklist. Tolor and Reznikoff (1967) found externality to be associated with higher overt death anxiety.

High scores on the Depression Scale of the Guilford Five-Factor Personality Inventory were found by Abramowitz (1969) to be associated with externality in both male and female subjects. Calhoun, Cheney, and Dawes (1974) further explored the relationships between locus of control and depression. Students were administered the I-E Scale, two standard measures of depression, and a special questionnaire assessing the degree to which subjects attributed their own periods of depression to causes within or outside of personal control. Calhoun, et. al., (1974) found externality in students of both sexes to be significantly related to scores on Zung's Self-Rating Depression Scale, said to measure relatively enduring symptoms of depression. For male but not female subjects, externality was also related to Lubin's Depressive Adjective Checklist, said to measure depression as a transitory mood. Among female subjects, however, degree of depressed mood was positively correlated with the tendency to hold oneself personally responsible for the mood.

Both suicidal potential and accident proneness as measured by self-report instruments were found by Williams and Nickels (1969) to be related to externality. While Williams and Nickels had hypothesized that accident proneness would be associated with internality, they note that many accidents have a self-destructive component. Their finding that suicidal potential and accident proneness had a similar relationship to locus of control will not surprise most students of life-threatening behaviors.

Trust and Distrust

A number of reports indicate that externally-oriented individuals, compared to internally-oriented ones, are hostile, distrustful, and suspicious. Thus Williams and Vantress (1969) found significant correlations between externality and five of the eight subscales of the Buss-Durkee Hostility Inventory, while Hamsher, Geller, and Rotter (1968) found that external subjects earned lower scores on the Rotter Interpersonal Trust Scale and were more likely to suspect that the Warren Commission Report was covering up important evidence relating to the assassination of President Kennedy. A study by Miller and Minton (1969) also characterized externals as more suspicious and distrusting, but Gray-Little (1974) failed to find a difference between internally-oriented and externally-oriented students on an indirect measure of conflict with authority. Tolor and Jalowiec (1968) found externality to be associated with the Hostility-Rejection and Authoritarian subscales of the Parental Attitude Research Instrument. Since the latter measures parental attitudes as perceived retrospectively by offspring rather than actual parental attitudes, it appears that external persons may be more likely than internal persons to feel that they have been the targets of hostility. A growing literature now exists on the antecedents of internality-externality ranging from birth order to parents' locus of control. Apart from this mention, however, this work will not be discussed here. In another study, Tolor, Brannigan, and Murphy (1970) found some limited support for their hypothesis that internally-oriented persons would feel psychologically closer to significant others.

Miscellaneous Characteristics

According to studies by Clouser and Hjelle (1970), Powell and Vega (1972), and Powell and Gable (1973), externality is associated with greater dogmatism, self-righteousness, and hypocritical attitudes toward others. Tolor and Reznikoff (1967) offered evidence that internals are more insightful than externals, while Baker (1971) interpreted his data to imply that externals, because of their presumed greater frustration, engage in more escapist fantasizing. However, the latter study, which found that externality in graduate students was associated with more time spent watching evening television and with reports of more frequent and more enjoyable dreaming, might also be taken to mean that externally-oriented graduate students are more relaxed at night than those who are internally-oriented.

Berzonsky (1974) found no difference in reflectivity between internally- and externally-oriented six and seven year old children, while Lotsof and Steinke (1973) failed to find differences related to I-E scores of junior high school students on the Guilford Unusual Uses Test, a measure of creativity. Lotsof and Steinke's internal and external subjects were also similar in the level of abstractness of their concepts used in a sorting task.

Coping With Threat

The issue of how internally-oriented and externally-oriented persons cope with threat has interested a number of researchers. Two questions are involved here: are there preferred defense mechanisms or coping strategies reliably associated with locus of control; and if so, how successful or adaptive are the mechanisms used?

As indicated earlier, externals are typically found to be more anxious and less well-adjusted than internals. This suggests that externals have less effective defenses. On the other hand, it has been noted that externality per se may be adaptive under certain circumstances. Gurin, Gurin, Lao, and Beattie (1969) and Lao (1970), for example, have argued that members of racial minority groups are realistic in their perceptions of external control, not in the sense of chance or fate, but in the sense of the social limitations placed upon them. According to these authors, blaming the system may be more productive for socially handicapped persons than blaming their personal inadequacies. In this connection, it is of interest that Harris and Phelan (1973) found that late adolescent blacks in an integrated school, where they were presumably at a disadvantage, were significantly more external than a matched sample of blacks in a segregated school.

Not only minority group members but also females in general are often said to be oppressed by the environment. Consistent with this, many studies have found women to be more external than men. Among women themselves, Ryckman, Martens, Rodda, and Sherman (1972) found that those with a stronger commitment to Women's Lib were likely to be more internal than those not as committed.

A limited amount of evidence exists suggesting that a preferred defense mechanism of the internal compared to the external is repression. Thus Tolor and Reznikoff (1967) and Altrocchi, Palmer, Hellmann, and Davis (1968) found that internality was associated with repression, denial, and avoidance, while externality was associated with sensitization as measured by the Byrne Repression-Sensitization Scale. Studies by Efran (1964), Phares (1971), Phares, Ritchie, and Davis (1968), and Lipp, Kolstoe, James, and Randall (1968) suggested that internals were more likely than externals to forget failure experiences or information potentially damaging to the ego. Rotter's explanation for the Efran finding was that "the external has less need to 'repress' his failures since he has already accepted external factors as determining his success and failure" (1966, p. 22).

A somewhat different shade of meaning is involved in the statement that the external may "project" responsibility for failure. Thus, a distinction is sometimes made between so-called defensive-externals and true-externals. For the defensive-external, externality (or projection) is the defense and is discarded when not needed, while the true-external attributes all events, positive or negative, to forces outside himself (Gilmor and Minton, 1974). Very recently, Sobel (1974) reported experimental results indicating that persons in general tend to attribute success to personal qualities and failure to outside factors. Nevertheless, Sobel also found that externals were more likely than internals to explain failure on the basis of features of the experimental task rather than their own intelligence, ability to concentrate, ability to think quickly, and skill in problem solving.

Lefcourt (1972), taking into account studies concerned with cognitive activity, willingness to defer gratification, and response to success and failure experiences, proposed that the apparent greater ability of the external to tolerate failure and to recall threatening information should be understood not as a nondefensive openness but rather as a tendency toward brooding rumination, a "cognitive overworking of negative details." According to Lefcourt, the internal may simply be dwelling less on his deficits as he "assumes an active stance toward his problems" (p. 22).

Findings by Brissett and Nowicki (1973) appear consistent with Lefcourt's view. Internals in their study reported reacting more constructively to frustration than externals, as measured by scores on the Child and Waterhouse Frustration-Reaction Inventory. In an actual task situation, externals spent more time on the task after receiving frustrating feedback. Brissett and Nowicki suggested that this longer time might have reflected a greater number of interfering responses. Also, they interpreted their finding that externals produced more negative outcome TAT stories after the frustrating task as indirectly indicating a less constructive reaction to frustration.

A finding by Andrew (1972) that internals delayed elective hernia surgery for a shorter period of time than externals also is consonant with Lefcourt's picture of the internal as someone who assumes a more active stance toward problems. A further result of the Andrew study was that combining locus of control, race, and repression-sensitization coping style improved prediction of delay.

Note on Classification of Subjects

Many studies quite properly classify subjects by sex, race, age, and other sociodemographic variables; and some assign subjects to different treatment groups. As in the Andrew study just cited, more than one personality dimension may be used. In particular, it may be helpful to categorize subjects in terms of whether they see forces outside themselves as benevolent, indifferent, or malignant. If one feels at the mercy of fate, it will matter to one whether fate is perceived as harsh or kind and whether one sees oneself as lucky or unlucky. In other words, a happy external may behave very differently from an unhappy external even though both feel powerless.

Naditch has in fact found it useful to classify persons along two dimensions: their "relative discontent" or discrepancy between aspired-to and actual state and their external-internal orientation. In a 1970 study, Naditch found that persons classified as highly discontented and externally oriented were more likely than persons in the remaining three categories to be hostile and aggressive. In 1974, Naditch also reported that among a large sample of blacks, hypertension was associated for men but not for women with membership in the highly discontented/externally oriented group. Naditch's approach seems promising.

Summary

The research cited above provides considerable support for Rotter's position that generalized expectancy of locus of control is a meaningful variable helping to determine many behaviors; in numerous studies, this hypothesis has received at least partial support. Unfortunately, studies in certain areas which have been quite heavily researched, such as the relationship between locus of control and risk-taking behavior or academic motivation/achievement, appear to yield very mixed results.

The research cited in this section further suggests that if one were confined to using a two-category nosology of personality, internality versus externality might be a reasonable choice. At least for persons who are majority group members in the American culture, internality appears to be associated with better over-all adjustment, a more positive self-image, and the possession of traits which are more likely to be socially approved and rewarded. Uncomfortable affective states such as depression and anxiety are more likely to be acknowledged by externals. The internal individual may rely on repression as a major defense, while the external may attribute blame outside himself. Within normal subjects, however, there is no implication that the reliance on these defenses is necessarily counterproductive.

Finally, the research indicates that persons in inferior social positions tend to be more external than those in stronger social positions. Internality-externality may have different implications for the adjustment of men and women and of persons from different racial backgrounds.

STUDIES OF PSYCHIATRIC INPATIENTS AND OUTPATIENTS

The relationship between serious psychopathology and locus of control has been examined in a number of studies, several of which will be cited below.

In his 1966 monograph, Rotter's stance was that seriously maladjusted persons might be expected to have more variability on I-E scores and probably "more frequently" to have high external scores. However, Rotter recognized the possibility that extreme scores, internal or external, might be associated with psychopathology. Reynolds (1973) cautioned that in fact persons at the extremes of the I-E distribution may qualitatively differ from individuals in the midrange. Presumably, contact with reality may be seriously impaired.

Ducette, Wolk, and Soucar's (1972) studies of problem children illustrate the point that the relationship between internality-externality and marked maladaptive behavior may be far from simple. These authors examined the relationship between locus of control and adaptability in two samples of grade schoolers who had displayed classroom behavior which warranted their referral to mental health professionals. Crandall's IAR Scale was used as the locus of control measure for these children and for matched nonproblem controls. Other variables included in the analyses were race, IQ, and sex.

The major conclusion of the study was that neither internality nor externality, per se, was related to maladjustment but rather that two separate maladaptive patterns existed in regard to problem children's assumption of personal responsibility for events. White problem children and high IQ problem children were highly internal in that they held themselves responsible for failure and negative outcomes. However, these children attributed success experiences to luck. Black problem children and low IQ problem children, on the other hand, assumed responsibility for positive events but were highly external in regard to negative events. Ducette, et. al., (1972) suggested that for both types of children, the discrepancy between locus of control for positive versus negative events may make for an insensitivity to, or blocking off of, environmental feedback. As a result, the discrepancy leads to maladjustment.

I-E Scores and Psychiatric Diagnosis

Several investigators have obtained locus of control scores from psychiatric patients an compared the scores for various diagnostic subgroups with each other and with normal groups.

In 1961, Cromwell, Rosenthal, Shakow, and Zahn reported that schizophrenics were more externally oriented than normal conscientious objectors.

Sivley and Johnson (1965) administered the MMPI and McConnell's locus of control instrument (The Opinion Survey) to 170 male patients and 20 hospital employees in a VA neuropsychiatric hospital. Patients with acute and chronic brain disorders were excluded. On The Opinion Survey, normals and persons with diagnoses of personality disorder or alcoholism did not differ from each other or from paranoid schizophrenics, persons with neurotic diagnoses, affective disorders, or mixed disorders. The group which stood out was the nonparanoid schizophrenics whose scores were significantly more external than those of the normals, the alcoholics, and the personality disorders. Results for the MMPI showed that while the K scale (understood as a measure of personality strength) was positively related to internality, the F, Hs, D, P, Pt, and Sc scales were all negatively related to internal locus of control.

Harrow and Ferrante (1969) studied 128 consecutive admissions to a short-term acute psychiatric inpatient facility. The entire sample were administered the I-E Scale during the first week of hospitalization, while 88 received a second administration six weeks later. The initial mean I-E score for the patient group as a whole (M = 8.70) fell within Rotter's normal range, but scores among diagnostic subgroups differed. Schizophrenics had the most external scores (M = 10.07) and a small group of manics (n = 5, M = 4.20) had the most internal scores. Means for depressed patients and patients with character disorders fell between and were similar to each other (M = 8.27 and M = 8.06, respectively). Harrow and Ferrante also analyzed their results by sex and age of patients. Among nonschizophrenics younger patients had more external scores than older ones, and males had more external scores than females. Among schizophrenic patients, males were also more external than females; however, older (25 years plus) schizophrenics' scores were more external than younger schizophrenics' scores. When the I-E scale was administered for the second time, the schizophrenic, character disorder, and manic groups had not significantly changed, but depressed patients' scores had become more internal with improvement. No difference was found in change scores between younger and older patients, but female patients had changed in the direction of internality. The summary statement of the authors was that "patients with greater psychopathology and fewer social skills (schizophrenics, younger patients, and, to a slight extent, males) were more external" (p. 582).

Process schizophrenics, reactive schizophrenics, and nonschizophrenic psychiatric patients were compared by Lottman and DeWolfe (1972). The groups were matched for paranoid symptoms as well as for age, education, and institutionalization. The process schizophrenics were found to be significantly more external than either the reactive schizophrenics or the nonschizophrenic controls, while the latter two groups did not differ from each other in locus of control.

Lottman and DeWolfe interpreted the results to mean that, within schizophrenia, locus of control reflects long-term social learning and not merely current symptoms. They further suggested that the reduced behavioral responsiveness of process schizophrenics may be related to their externality; because of their feelings of helplessness against environmental threat, schizophrenics may need to block out disturbing inputs from the environment.

A more recent study by Cash and Stack (1973) employed an all male, almost entirely white sample of 61 psychiatric patients ranging in age from 19 to 60 years. Subjects had no history of alcoholism, mental retardation, central nervous system disorder, or recent or extensive electroconvulsive shock and had minimally achieved a seventh grade reading ability level. Schizophrenics were classified as paranoid ($n = 24$) or nonparanoid ($n = 19$) as measured by the Pa scale of the MMPI, as having had a good ($n = 22$) or poor ($n = 21$) premorbid adjustment as measured by the Ullmann-Giovanni Scale, and as being acute ($n = 20$) or chronic ($n = 23$) on the basis of months since first hospitalization, months of current hospitalization, number of admissions, and total months of hospitalization. Small groups of psychotic depressives ($n = 5$), anxiety neurotics ($n = 5$), and neurotic depressives ($n = 8$) completed the sample.

I-E Scale findings for the various main diagnostic groups were compared with results from Lefcourt and Ladwig's (1965) sample of white prisoners. The schizophrenic and psychotic depressive groups had significantly higher external scores than the prisoners, while the two neurotic groups did not differ from the prisoner sample.

Within their own sample, Cash and Stack further found that psychotic patients were significantly more external than neurotics, and schizophrenics were significantly more external than all nonschizophrenics combined. Paranoid schizophrenics ($M = 13.17$; $SD = 3.38$) were more external than nonparanoid schizophrenics or any other group. Schizophrenics with good premorbid adjustment tended to have more internal scores than those with poor premorbid adjustment, but the difference was not statistically significant. Acute schizophrenics were significantly more external than chronics.

Cash and Stack stressed the importance of the paranoid dimension and noted that "in general, the more external the schizophrenic, the stronger his endorsement of paranoid and schizophrenic characteristics...and the stronger his expression of a self-critical, symptom-admitting attitude, i.e., the lower his K score" (1973, p. 116).

Pryer and Steinke (1973), citing earlier findings (Smith, Pryer, & Distefano, 1971, and Shybut, 1968) that more severe impairment among psychiatric patients is related to externality, gave the I-E Scale to small groups of males and females within two weeks of hospital admission in each of the following diagnostic categories: schizophrenia, chronic undifferentiated type; schizophrenia, paranoid type; depressive neurosis; and personality disorder. The age range in this sample was 16-60, with a mean of 32.2 years.

Their analysis showed that paranoid schizophrenics and personality disorders, who did not differ from each other, had significantly more external scores than undifferentiated schizophrenics and depressive neurotics, who again were similar to each other. These means were: paranoid schizophrenics, 10.1; personality disorders, 9.4; chronic undifferentiated schizophrenics, 7.4; and depressives, 6.1.

Age was not related to I-E scores for the sample as a whole or within diagnostic groups, and no significant effect was found by sex.

Twenty-three adolescent females presenting to a medical clinic with the primary problem of obesity were discussed by Held and Snow (1972) and Snow and Held (1973). A group mean of 11.1, SD = 3.5, was reported. In addition, quite high positive correlations were found between I-E scores and eight of the basic clinical scales of the MMPI plus Welsh's anxiety (A) scale. The ego strength (Es) scale was inversely related to I-E. The mean MMPI profile was also generally elevated, particularly on the Pd and Sc scales.

When I-E scores for the obese adolescents were compared with nonobese controls at the same clinic, no significant difference was found, although the nonobese group mean was lower (M = 9.8, SD = 3.0). Based on MMPI and Mooney Problem Checklist scores, the obese group was more disturbed. Obese patients appeared to have poorer impulse control and to be more depressed, alienated, nonconforming, and distrustful. Held and Snow felt that while the eating behavior of obese adolescents may be influenced strongly by external factors, their generalized locus of control expectancy may be quite similar to that of peers whose weight is normal.

Locus of Control and Other Attributes of Psychiatric Patients

While the studies in the preceding section were concerned chiefly with the relationship between locus of control and diagnostic labels, other patient attributes have also been examined, including patients' presentations of themselves as sick or healthy, patients' perception of ward atmosphere, patients' preferred interpersonal distance, and whether or not patients were in crisis.

Fontana, Klein, Lewis, and Levine (1968) classified white male mental patients, including schizophrenics, on the basis of their presentations of themselves as healthy persons or sick persons (the amount of psychopathology they attributed to themselves on a modified version of the Edwards Social Desirability Scale). Relationships between healthy/sick self-presentation and a broad array of other variables, including the I-E, were investigated for patients in three hospitals who were receiving active treatment or custodial care. In most of the samples, patients who presented themselves as sick were significantly more external than those who presented themselves as healthy.

Mean I-E scores of healthy self-presenters in Fontana, et. al. (1968), ranged from M = 5.6, SD = 3.6 to M = 8.2, SD = 4.1. Those of sick self-presenters ranged from M = 12.4, SD = 4.2 to M = 8.7, SD = 3.1. Thus many of the mean scores reported would not distinguish these patient groups from normals in the same average age range (middle to late 30's).

In a study of male patients' perceptions of ward atmosphere in a VA psychiatric hospital setting, Kish, Solberg, and Uereck (1971) collected Ward Atmosphere Scales and Ward Initiative Scales as well as I-E scores from 169 patients, whose answers were largely anonymous. The mean I-E Scale for their sample was 9.1, SD = 4.2, similar to that found by Harrow and Ferrante and to Rotter's normative scores for college students. Perceptions of patients with I-E scores of 4 or less were then compared with perceptions of those whose scores were 12 or more. Internally-oriented patients were significantly more likely to have more positive perceptions of the ward. Some evidence was also obtained that externals had been hospitalized for significantly longer average periods of time than internals. Since internal patients apparently perceived the wards as the scene of active treatment while external patients perceived them as more custodial, the authors questioned whether prolonged hospitalization may not foster externality and whether patients' appraisals of wards may not be realistic ones.

Duke and Mullens (1973) investigated preferred interpersonal distance from others in three groups of women: chronic schizophrenics, not paranoid type; patients with affective disorders; and nonprofessional hospital employees. The psychiatric patients were matched for length of hospitalization and were included only if two years or more had elapsed since initial diagnosis. The average age of all three groups was the early 30's. Locus of control was measured with the adult Nowicki-Strickland scale and interpersonal distance preference by the Comfortable Interpersonal Distance Scale.

Study results revealed that schizophrenics were significantly more external than those with affective disorders, and the latter were significantly more external than employee controls. For the two patient groups, but not for the controls, externality was positively related to greater preferred distance.

Interested in the possible impact on I-E scores of situational factors, Smith (1970) compared a group of patients presenting to a psychiatric emergency clinic because of acute life crisis with a similar but noncrisis group who were beginning long-term psychotherapy. Both groups were administered the I-E on two occasions, six weeks apart. Since crises are presumed to resolve in about six weeks' time, Smith hypothesized that the crisis group would initially be more external than the noncrisis group but that their scores at second administration would be shifted toward internality. He expected that the scores of the noncrisis group would show little change and that the magnitude of change in the crisis group and for the whole sample would be negatively correlated with age.

The prediction that the crisis group would be significantly more external at initial administration was not supported (crisis M = 10.08; noncrisis M = 9.63), nor was the prediction that magnitude of change between the two I-E administrations would be negatively related to age. However, the crisis group's scores changed significantly toward internality over the six weeks' period (6-wk., M = 7.12), while those of the noncrisis group did not (6-wk., M = 8.86).

Smith speculated that the relatively external initial scores of the noncrisis group might reflect the fact that this group consisted of maladjusted persons, while the crisis group might have been largely internal individuals whose initial scores were elevated because of temporary inability to cope with problems; the scores of the crisis group at second administration would then represent a return to normality for them. Had Smith been able to demonstrate that the crisis group consisted of persons without a previous psychiatric history, this idea would have been strengthened. Nevertheless, Smith's suggestion is interesting, that internals may be more threatened than externals when their usual coping devices fail and thus may be more likely to experience a crisis under such circumstances.

Summary

The major implications of studies noted in this section appear to be: (1) Within the psychiatric groups considered here, just as within normal groups, externality is "bad" and internality is "good" (except perhaps for manics who may carry a good thing too far). (2) Greater externality perhaps may distinguish schizophrenics from other diagnostic groups, but there is disagreement whether paranoids are more external than other subtypes. (3) Locus of control is sensitive to short-term situational distress, and this complicates efforts to relate it to more long-lasting conditions upon which distress of this kind is superimposed. Perhaps when a disorder has stabilized and prognosis is poor, a place on the internal-external continuum can be fairly reliably assigned to it. (4) Maladjustment may sometimes involve discrepant locus of control expectancy patterns in which responsibility is self-attributed either for positive events only or for negative events only.

STUDIES OF CHEMICAL SUBSTANCE ABUSERS OR POTENTIAL ABUSERS

General Considerations

Many theories of the etiology of drug dependence have considerable merit, but their relevance to prevention and treatment may vary at different points along the spectrum of drug experimentation, use, abuse, dependency, and addiction. Psychodynamic variables and biological change considerations are probably more significant toward the dependency/addiction end of the spectrum than at the opposite end. Curiosity and peer group pressure, on the other hand, seem to be extremely influential in drug experimentation. In order to encompass all significant phenomena, a trinitarian social-psychological-biological approach may well be necessary.

As Goode has said, "drug users turn out to be almost everybody" (1973, p. 34), yet relatively few persons move beyond a stage of moderate social use. Why others do move beyond, as well as how to treat them with routine success when they do, is still unclear. For some authorities, the issue of whether there may be a general addiction-prone personality type remains open (O'Donnell, 1972); for others, the only generality is that imposed by the substances themselves (Dole & Nyswander, 1967). Perhaps a reasonable middle view is that there are major subgroups of abusers whose identification will be useful (Plumb, Taintor, & D'Amanda, 1973).

Sadava (1975) has underscored the importance for research of abstracting stages of progressively deepening drug involvement and of studying the correlates and predictors of each. The investigators whose work is described below hypothesized that locus of control might be such a correlate or predictor.

Studies of Alcoholics and Beginning Drinkers

Among the first reports on locus of control among alcoholics was that of Goss and Morosko (1970). Observing that alcoholics have typically led somewhat marginal social existences over a long period of time and appear passive and dependent, Goss and Morosko predicted that alcoholics' locus of control orientations should be external. In addition, the authors expected to find significant relationships between I-E scores and several MMPI scales. Two sizeable male and one sizeable female sample of alcoholic outpatients, however, received internal mean scores (between 6.11 and 6.77) on the I-E. For female patients, only the Pt score of the MMPI was associated with externality, while for the male samples, I-E correlated positively not only with Pt, D and F as predicted but also with Hs, Sc, and Si, and (in one sample only) with Ma as well. Internality was related to the K scale for males. Age was not related to I-E scores for any sample, but an intelligence measure was negatively related to externality for one of the male samples.

Goss and Morosko reasoned that, compared to other groups with restricted alternatives, alcoholics have a means of altering their subjective states and thus may perceive themselves as in control. Further, these authors felt that the guilt and self-blame experienced by many alcoholics is compatible with internality. Among male alcoholics, they suggested, those with more external scores may have less ego strength and more pathology.

Gozali (1970) hypothesized that in order for individuals to undergo the gradual process of becoming alcoholics, they must in fact believe they are in control of the situation and able to alter their behavior at any time. His prediction was therefore that alcoholics would have internal locus of control orientations. A group of white, male, first admissions to an alcoholism treatment unit was compared with a combined control group of members of two churches. The groups were similar in age (early 40's) and social class status (mostly middle). A subgroup of the alcoholics was also retested three months later. Results showed that the alcoholics received more internal I-E scores than the controls both at first admission and at follow-up. The correlation between first admission and follow-up I-E scores of the alcoholics was .81.

Gozali speculated that alcoholics may be persons who engage in excessive drinking because they have a high need for control which is blocked from behavioral expression. According to this view, frustration as well as the misguided belief that drinking can be kept under control may be implicated in the etiology of alchoholism.

Gozali and Sloan (1971) reiterated the theme of the alcoholic's stubborn belief in his ability to control his drinking, a belief he maintains despite environmental feedback to the contrary. After reporting on the same sample as Gozali had discussed in his earlier paper, these authors offered data on 101 white inpatients who were administered the MMPI and the Revised Beta as well as the I-E scale. While Gozali's finding that alcoholics are internal was supported in the second sample, no significant correlations were found between the I-E scale and the MMPI, a result contrary to that of Goss and Morosko. Nor was a significant relationship found between the I-E and the Revised Beta, a measure of intelligence.

Burnes, Brown, and Keating (1971) who collected I-E and MMPI data on a sample of 25 male rescue workers ranging in age from 17 to 30, also compared their findings with those of Goss and Morosko. For the rescue squad group, a mean I-E score of 7.52 was obtained, but the authors do not state whether the mean significantly differed from means found by Goss and Morosko. As in the Goss and Morosko sample, I-E scores were negatively correlated with K and positively correlated with F on the MMPI. A negative correlation found between I-E and the Hy Scale was interpreted to mean that more internal subjects are likely to deny difficulties and inadequacies. The authors concluded that externality in alcoholics appears to be associated with affective and thought disorders and that for both normal and deviant groups internality may be related to self-control.

Gross and Nerviano (1972), studying lower socio-economic class, white alcoholics whose average age was in the early forties, found their sample's mean I-E score to be 7.35, SD = 3.72.

Distefano, Pryer, and Garrison (1972) compared 50 male alcoholics with 50 emotionally disturbed inpatients, the majority of whom were schizophrenics. Compared to Rotter's normative male data, the alcoholics were more internal and the psychiatric patients more external. Among the alcoholics but not the psychiatric patients, I-E scores were negatively correlated with both age and IQ, as measured by the WAIS. The authors observe that in their study deviance was associated, for different groups, with different ends of the locus of control continuum.

Oziel, Obitz, and Keyson (1972) took as their point of departure the idea that alcoholics, as evidenced by their passive-aggressive behavior, may be internally-oriented persons who are frustrated in, and by, situations in which they feel others are attempting to take away their control. Earlier locus of control research, in fact, has suggested that internals become resistive and negativistic when they become aware of subtle efforts to influence their behavior. Oziel, et al., predicted that alcoholics might be internal not only in regard to their generalized expectancies but also in regard specifically to drinking behavior. A special scale devised to measure locus of control of drinking was administered together with the I-E Scale to 50 alcoholics (37 male, 13 female) of average age 45 years. On the I-E this sample's mean score was 6.1. I-E was significantly correlated with the perceived locus of drinking scale (r = .52). Scores on the latter supported the authors' hypothesis that alcoholics perceived the locus of control of drinking behavior to reside within themselves.

Butts and Chotlos (1973) criticized the control groups employed in the Goss and Morosko (1970) and Gozali and Sloan (1971) studies and suggested the possible influence of experimenter bias.

Subjects in Butts and Chotlos' study were 74 alcoholics (in two treatment programs) and 68 controls (persons without a history of alcoholism who were either workers in a steel plant or male patients visiting a general practitioner). Alcoholics and controls did not differ in socioeconomic class; and while the alcoholics group was significantly older, no correlation was found between age and I-E. Although Marlowe-Crowne and I-E scores were also significantly related, the alcoholics and controls did not differ on the social desirability measure.

In contrast to earlier findings, Butts and Chotlos' alcoholics were significantly more external than their controls (M = 8.28 and M = 6.01, respectively). Means for the alcoholics were comparable to those reported by several researchers for older normals.

Suggesting that age and social class may have opposite impact on I-E scores, Butts and Chotlos felt that age is the more important variable.

Male VA alcoholic patients of average age 47 years were administered the I-E Scale and the MMPI by O'Leary, Donovan, and Hague (1974). In addition to standard scoring of the I-E Scale, scores on two subscales (Berzins' and Ross' Personal Control and Sociopolitical Scales) were calculated. The mean score for the full-scale I-E was again internal (M = 6.74, SD = 3.76). Few correlations were found between the two I-E subscales and MMPI scales, but positive correlations were found between the I-E as a whole and the F, D, Pt, and SI scales. Negative correlations were found with the L and K scales. The authors noted that external alcoholics appeared depressed, anxious, dissatisfied, and inclined to exaggerate the ills of the world, while internal alcoholics, like internal normals, were relatively high in ego strength and competence.

In another publication, the team of O'Leary, Donovan, and Hague reported on administering the Taylor Manifest Anxiety Scale plus an "unobtrusive" anxiety measure (the subscale of the Activity Preference Questionnaire, presumed to be a subtle measure of anxiety reactivity or proneness) to what was apparently the same sample of alcoholics. On the basis of a median split, they divided the sample into internals (M = 3.19, SD = 1.70) and externals (M = 9.00, SD = 3.3). While the externals were significantly higher on anxiety as measured by the Taylor scale, there was no evidence that internals and externals differed in social anxiety, unobtrusively measured. The authors' interpretation was that it may be more useful to think of the Taylor Scale as a measure of self-esteem rather than anxiety.

The adult Nowicki-Strickland locus of control scale was administered in a 1974 study by Nowicki and Hopper to small groups of male and female alcoholic inpatients and outpatients. Their subjects were additionally administered a figure-copying task and three verbal subscales of the WAIS. Female inpatients were found to be significantly more external than the three remaining groups; scores for female inpatients were similar to those of hospitalized schizophrenics. The authors speculated that female alcoholics may be a relatively more disturbed group than male alcoholics. Psychomotor impairment and lower verbal intelligence were both related to externality in this study.

Palmer (1971), observing that the sense of personal identity is disturbed or defective in many forms of psychopathology, compared nonpsychiatric hospital patients with psychiatric patients, including a subgroup of alcoholic psychiatric patients. Palmer's hypothesis that psychiatric patients would receive more external I-E scores than nonpsychiatric patients was confirmed. In addition, alcoholic psychiatric patients were more external than nonpsychiatric patients; and there was a trend, which did not reach statistical significance, for them to be more external than the remaining psychiatric patients as well.

A study by Drasgow, Palau, Taibi, and Drasgow (1974) addressed two areas: (1) the nature of the relationship between locus of control scores and scores of levels of interpersonal functioning, and (2) the relationship of these scales to pragmatic indices of adjustment such as employment record, financial solvency, and successful adult living. Three small (n = 12) groups of adult males were studied. One group consisted of first and repeated admissions to an alcoholism treatment program, while a second group consisted of first and multiple offenders in a penitentiary. Both of these groups were highly unsuccessful persons in terms of conventional social criteria. The third or "antithesis" group consisted of persons who were extremely well-adjusted as judged by their economic, vocational, and marital situations. Measures employed in the study were a modified version of the I-E scale and certain levels-of-functioning items derived from a standardized list. The levels-of-functioning measure successfully discriminated between the "antithesis" group and the alcoholic and prisoner groups. The locus of control data failed to reveal statistically significant differences among the three groups or between first and multiple offenders or first and repeat admission alcoholics. Internality was associated with higher levels of interpersonal functioning in all three groups.

Drasgow, et al., noted that they had some additional evidence that successfully rehabilitated alcoholics become more internal. In a personal communication (1975), James Drasgow reported that among a larger sample now collected, alcoholics whose initial locus of control scores are more internal appear to be more likely to succeed in treatment.

In a study by Cohen and Phelan (1972), male alcoholics in a VA hospital received a series of aversive conditioning sessions in which shock could be terminated or avoided altogether by spitting out alcoholic beverages. Patients were given a choice as to what single beverage (e.g., bourbon), what type of alcoholic beverage ("hard" or "soft"), or what combination of beverages they preferred to use in the experiment. A series of extinction sessions followed the conditioning sessions. Generalization of conditioned anxiety (heart rate) responses to several types of alcoholic beverages was examined for internally and externally oriented patients.

Although they did not give I-E means for their internals and externals, Cohen and Phelan reported that the externals generalized significantly more often than internals and that they were more resistant to extinction. All patients who persistently chose one kind of beverage were internals, while patients who combined hard and soft beverages were predominantly externals. Cohen and Phelan argued that externals may tend to drink "anything" because they consider society at fault for their condition and see themselves as not in control of their destinies; internals may feel personally responsible for their drinking habits and manifest their belief that they are in control by sticking to one beverage.

Jessor, Young, Young, and Tesi (1971) postulated that drinking may function as an adaptive response or coping mechanism for some individuals but that this would be dependent upon particular socialization experiences. Their study examined three samples of 21-year-old males living respectively in Boston, Massachusetts, and Rome and Palermo, Italy. All four grandparents of every subject had been born in southern Italy.

Measures of expectation of attaining personal goals, of alienation, and of the subject's feeling of internal control were obtained. In addition, self-reports of the quantity-frequency of alcohol intake, of the frequency of drunkenness during the preceding year, and of various "personal effects" of drinking such as mood alteration were collected.

Internality and high expectations of goal achievement were positively associated in all three samples, but the Boston sample scored significantly higher in internality than either of the Italian samples. Alienation and frequency of drunkenness were related positively, while internality was negatively correlated with quantity-frequency of alcohol intake. For the Boston sample only, the more alienated the subject, the more "personal effects" of drinking he was likely to report; internality and "personal effects," however, were not significantly associated. In the Boston sample only, the lower the expectations of goal attainment, the greater the alcohol intake and frequency of drunkenness. A further finding was that although drinking began earlier for the Italian samples and the overall alcohol intake of the groups did not differ, the Boston sample acknowledged more frequent drunkenness and more adverse physiological reactions.

The authors concluded that for young males in the American culture, drinking may serve as a means for dealing with frustration, while drinking apparently does not serve this function for the young Italian male. Differences between the two countries in socialization practices related to drinking behavior were believed to account for this and other findings.

A 1972 study by Jessor and his colleagues (Jessor, Collins, & Jessor, 1972) addressed itself to the question of the process involved in becoming a drinker during adolescence. Junior and senior high school students were categorized for drinker status in a first and a follow-up year. Three groups were formed. Group A (n = 221) reported being abstainers in both years, and Group C (N = 368) reported being drinkers in both years. Group B (n = 77) reported a switch in drinker status from abstainer to drinker. A large battery of measures, including a 15-item locus of control measure, was then examined in an effort to determine which would discriminate between Groups A and B, with Group C used as a reference. Social support for drinking from peers emerged as the single most important factor involved in status shift. Other useful predictor variables were the value placed on academic recognition and the value placed on independence. The locus of control measure failed to distinguish between Groups A and B during either the preshift year, or the follow-up year. Nor did Groups A and B differ in terms of the magnitude of change on the measure which occurred between the two years. Finally, the measure did not appear to be helpful in the characterization of students who had problems associated with drinking (about 10%) compared to those who began drinking but did not have problems. Locus of control and a second measure which examined perceptions of the regulations and sanctions to be expected from parents were apparently the least useful measures in the battery employed in this carefully thought-out major study.

Carman (1974) examined the relationship between locus of control and alcohol use among high school students in two small rural communities in Wyoming. The 53 students who participated in the study constituted almost the entire high school enrollment. In addition to the I-E scale, the students were administered several self-report measures, including two measures of motivation for drinking, measures of quantity-frequency of alcohol use and of social complications related to drinking, and measures of frequency of socially disapproved behaviors engaged in in the past and anticipated for the future, plus a measure of satisfaction with living in the community.

All but three students reported some drinking. Internally oriented students were significantly less likely to indicate that they drank in order to cope with personal problems. They also tended to report more social-conviviality motivations for drinking. However, I-E scores were not significantly related to quantity-frequency of drinking or social complications of drinking. Internality and reported satisfaction with the community were positively related, and there was a tendency also for internals to report less past and anticipated future delinquent behaviors generally.

Carman accounted for the failure to find a significant correlation between I-E scores and measures of quantity-frequency or social complications of drinking on the basis that in this young population, "even though negative motives for drinking and dissatisfaction with life can be observed, heavy drinking patterns with consequent social complications have not yet emerged" (1974, p. 132).

Summary: Studies of Alcoholics and Beginning Drinkers

Several themes of interest emerged from the studies cited above. First, although Butts' and Chotlos' criticisms of the control groups used in earlier studies were well founded and their own controls were an apparent improvement, nevertheless, the consensus was that white male alcoholics tend to be more internally oriented than their normal nonalcoholic counterparts. The mean I-E score of the Butts and Chotlos alcoholic sample (M = 8.28) was not itself conspicuously external.

Second, it is apparent that within alcoholic samples externality tends to be more highly associated with other psychopathological symptoms and perhaps also with lower intelligence, while internality is associated with a higher level of adjustment and with improvement. What this may mean is that although the male alcoholic is likely to be internal in orientation, nevertheless, when alcoholism is a secondary diagnosis, when the alcoholic is first drying out, or when his troubles have in some fashion climaxed, he will shift toward externality.

Third, locus of control data for female alcoholics are in even shorter supply than data for males, and few race comparisons have been made. In a personal communication, Nowicki (1975) reported that he and his colleagues have found externality to be associated with alcohol abuse for women and adolescents and internality to be associated with alcohol abuse for men. The importance of sex differences for understanding alcoholism is a point often made in the broader literature on alcohol abuse; there seems every reason to expect that sex differences in locus of control of alcoholics will also become apparent.

Fourth, several suggestions were made to account for the relationship between alcoholism and internality. Gozali, and Gozali and Sloan, hypothesized that internality predisposes the individual to become an alcoholic since he is able to persist in a belief in his own ability to control his drinking despite many counter-indications. The position of Oziel, et al., also implies that internality may be a predisposition for alcoholism. Here the potential alcoholic may be seen as a frustrated and underachieving internal who resorts to a passive-aggressive mode (drinking) of controlling the environment.

The Goss and Morosko position, on the other hand, is essentially that drinking is a mechanism for altering the alcoholic's conception of himself as helpless and inept. In this view, the alcoholic drinks in order to feel internal, while according to Gozali and Sloan, and Oziel, et al., he drinks because he is internal.

Fifth, the Jessor, et al., and Carman studies stand by themselves in their social-psychological approach and in their concern with early cross-cultural drinking patterns and with the correlates of early alcohol use. The Jessor, et al., (1972) study casts serious doubt on locus of control as a variable which will predict persons at risk for alcohol use/abuse.

Studies of Opiate and Other Drug Users

Schoof, Ebner, Lowy, and Hersch (1974) investigated several sociodemographic and personality characteristics of male addicts enrolled in a treatment program using Cyclazocine. Patients in the program were in their late teens and early twenties, and came from two sociologically distinct areas, a large city black ghetto and a white upper middle class suburb of the same city. When patients were compared on the basis of ghetto vs. suburb, no significant difference was found in mean locus of control scores (ghetto M = 8.50; suburb M = 8.47). When subjects were classified instead as neurotic and nonneurotic (character disorder) as determined by MMPI scores, the neurotic group was found to have a significantly more internal mean score (M = 7.30) than the nonneurotic group (M = 9.81). Neurotics and nonneurotics did not differ in WAIS scores or in social class, age at program intake, drug use, heroin use, duration of heroin use, or length of schooling. The failure to find differences in locus of control when the sample was divided on the basis of ghetto versus suburb is contrary to what might have been expected, given persistent reports in the literature describing the minority group member as more external. Here, among an all addict sample, externality was associated with psychiatric diagnosis rather than with neighborhood.

Berger and Koocher (1972) seized an unusual opportunity to assess the sensitivity of the I-E scale to situational factors. Thirty-one black and Puerto Rican addicts of mean age 18.6 years were administered the measure as part of routine admission procedure when they were involuntarily committed to a treatment center. At admission their mean I-E score was 12.2, SD = 4.8. Some time thereafter (on the average, 2.5 weeks), curtailment of funding for the center forced its closing and the referral of patients for "after-care" in their home communities. Immediately after this announcement was made, the I-E was readministered. This time the mean I-E proved to be significantly more internal (M = 9.5, SD = 4.2) than before, and a significant negative test-retest correlation coefficient of -.38 was found between the two sets of scores. The authors interpreted their findings as consistent with a state-trait view of the I-E scale and suggested that subjects' locus of control orientations had altered in anticipation of a more independent status. The finding may also be understood, perhaps, as reflecting a lifting of depression or anxiety.

In the Berzins and Ross (1973) study, sizeable samples of black and white male and female addicts were compared on I-E scores with male and female college students, almost all of whom were whites. According to Berzins and Ross, while the phenotypic passivity, dependency, and maladjustment of many addicts imply externality, there are other addict characteristics and behaviors suggestive of internality. The latter characteristics include egocentricity, hedonism, social nonconformity, resistance to treatment, high rate of relapse, and willingness to experiment with new drugs.

Addicts of both sexes and races in the Berzins and Ross sample emerged as significantly more internal than student controls. Using standard scoring of the I-E, means for the addict groups ranged from 7.35 for white males to 8.03 for black females, as compared to 10.33 for college males and 10.19 for college females. Male and female students did not differ in mean scores, but black female addicts were less internal than the remaining addict subgroups. Item analyses showed that addicts chose internal alternatives significantly more often on 16 scale items, and students chose internal alternatives significantly more often on five scale items. For example, roughly two-thirds of addicts but only one-third of students attributed misfortunes to lack of ability, laziness, or ignorance; on the other hand, students were more internal on items dealing with ability to plan ahead and to make friends and decisions.

In their interpretation of results, Berzins and Ross propose that addicts may develop a "pseudo-internality" as a by-product of drug experiences which give them temporary control over disagreeable affect states; the predominant affect which is controlled will depend on whether the particular addict tends to be neurotic, psychotic or sociopathic. The Berzins and Ross position is therefore that internality is acquired due to drug use relatively late in development, but that externality is fundamental to the addict personality structure.

The "pseudo-internality" hypothesis is consistent with the self-medication theory of addiction and with the well-known phenomenon that addicts often seek rehabilitation only when they can no longer compete effectively as hustlers; that is, when they cannot continue to control their reinforcements. One should accordingly expect to find that addicts who become drug free should also become more external; moreover, their internality should extinguish.

An unfortunate drawback to the Berzins and Ross study is that their addicts were, on the average, 10 years older than the student comparison groups. On the basis of the age difference alone, the addicts might have been expected to be more internal. Berzins and Ross recognize this problem, but their arguments that it is not too serious are not entirely convincing.

In a study paralleling earlier work with an alcoholic group, Obitz, Oziel, and Unmacht (1973) administered both the standard I-E scale and a specially designed measure of locus of control of drug-taking behavior to a racially mixed sample of juvenile (average age = 15.2 years), male and female drug users. Subjects were being held in detention and awaiting adjudication for various offenses. To be included in the sample, they had to report having used amphetamines, hashish, heroin, LSD, or marihuana more than once during the preceding year. Among the findings of the study was that 18% had used heroin more than 10 times, while 32% had used it between two and 10 times. Amphetamines had been used more than 10 times by 42%, and alcohol by 79%.

The mean I-E score of the sample was 14.0, significantly more external than mean scores reported in the literature for such groups as prisoners aged 18 through 26, 18-year-olds for the Boston area, and black college students. The fact not only that the subjects were youthful but that they were in an anxiety-arousing situation may have contributed to the externality of their I-E scores. On the measure of locus of control of drug-taking behavior, subjects were apparently not more external than internal, and indeed no significant correlation was found between the two locus of control measures. On the basis of these findings compared to those for alcoholics, Obitz, et al., (1973) concluded that alcoholics and drug users may have dissimilar beliefs about their own responsibility for life difficulties and that persons addicted to different substances may not react in the same way. However, the measure of locus of control of drug-using behaviors, although it appeared to have considerable face validity, was a new instrument. Also, results were not reported by sex.

Using what was apparently the same measure of "specific perceived locus of control with regard to drug-taking behavior" as well as the I-E Scale, Obitz, Cooper, & Madeiros (1974) studied a sample of 50 heroin addicts in a detoxification program. The subjects were all white males, with an average age of 20.6 years.

A mean I-E score of 10.84, with a standard deviation of 4.1, was obtained and found to be significantly more external than the means of several comparison groups. Consistent with the 1972 study, subjects did not endorse externally keyed items more often than they endorsed internally keyed items on the measure of locus of control of drug-taking behavior, and this measure and the I-E Scale were not significantly correlated.

Obitz, et al., considered that these findings reaffirmed their earlier conclusion that "alcoholics and drug users do not have similar beliefs regarding their respective roles in causing whatever difficulties they experience in life" (1974, p. 760).

Calicchia (1974) tested three predictions derived from the narcotic-induced internality position of Berzins and Ross (1973). He argued that if the position is correct, then addicts should have a more internal locus of control than nonaddicts. Also, addicts on methadone maintenance should be more internal than those who are abstinent (since the former continue to receive the substitute reinforcement of methadone), and addicts who have been addicted longer should be more internal than those who have been for shorter periods. Subjects in the study were 60 male patients on methadone maintenance and 60 male patients who had been detoxified three to five months previously, plus a control group of 52 nonprofessional male staff not known to have had histories of addiction. Except for two whites, subjects were black or Puerto Rican. All three study predictions were borne out: 1) addicts were more internally oriented than staff controls; 2) with the effects of age partialled out, a positive correlation was found between internality and length of addiction; and 3) patients on methadone maintenance were more internal than those who were abstinent.

As Calicchia points out, the greater internality of addicts versus controls sheds no direct light on the issue of the possible acquisition of internality through drug use. Further, the difference in internality between addicts on methadone maintenance versus abstinence may reflect a separate factor involved in the voluntary selection of these modalities. It is also possible that more internal persons are likely to remain addicted over a longer time span. Nevertheless, the findings of the study are encouraging to the Berzins and Ross position.

Jones (1973), in a review of work at the Clinical Research Center for opiate addicts in Lexington, Kentucky, reported several characteristics of addicts who were less likely to seek treatment which entailed maximal self-help and more likely to leave a therapeutic community prematurely: "Lower internality" was one such characteristic, while others were being black, being older, being less middle class, and being more self-devaluing and emotionally disturbed.

Robinson (1973) reported on data obtained from 80 heroin addicts and 37 nonopiate (marihuana, glue, alcohol, amphetamine, or barbiturate) drug users who were administered the Tennessee Self-Concept Scale, the FIRO-B scale which measures characteristic behavior related to others, the FIRO-F Scale which measures characteristic feelings about others, the Success-Failure Inventory, and the I-E Scale. Locus of control findings included the following: the mean score for the total sample was 10.4, but the addict subsample had a significantly more internal mean score than the nonopiate group; adult users of opiate and nonopiate drugs combined, compared to users who were minors, had significantly more internal scores; patients on methadone maintenance, as opposed to those whose methadone had been withdrawn, had been addicted longer and (as in Calicchia's study) were more internal. Locus of control did not discriminate between voluntary and involuntary patients, nor between those who actually entered and failed to enter programs, nor between persons who dropped out of and remained active in the methadone withdrawal treatment modality. Mean scores for the subgroups entering into these comparisons were not given.

In a 1974 publication, Strassberg and Robinson reported that, for a sample of 60 self-identified heroin addicts (47 male, 13 female), I-E scores were significantly associated with 12 of 22 scales derived from the Tennessee Self-Concept Scale, the FIRO-B, the FIRO-F, and the Success-Failure Inventory. Internality was associated with better self-esteem, higher motivation to achieve success, lower motivation to avoid failure, and with various aspects of interpersonal relations. The authors commented that better adjustment and more positive self-concept appear to be related to internality among narcotic addicts as among persons who do not use drugs.

Forty female adolescent drug users (blacks, whites, and Puerto Ricans) were the focus of a report from Coghlan and Gold (1974), who found that approximately 50% of the sample could be characterized as having a borderline level of personality organization. According to Coghlan and Gold, "pervasive feelings of lack of control over their own lives is a central dynamic" (1974, p. 1); these adolescents commonly have histories of repeated failure or hopelessness which they attempt to assuage by resorting to drugs and other self-destructive behaviors, including self-mutilation by cutting. Coghlan and Gold found that the number of self-destructive acts engaged in by their patients was positively related to externality ($r = .30$) and negatively related to a self-esteem measure. For a subsample of 21, I-E scores were found to move in the direction of greater internality as subjects responded favorably to treatment.

Working in the broad context of social learning theory, Sadava (1973) reported results of six-month longitudinal study of 151 college freshmen who acknowledged some use of, as a minimum, cannabis. Students were of both sexes and average age was 17.6 years. They were classified along three dimensions of use: 1) frequency of cannabis use; 2) stage (initial, casual, occasional, regular) of drug use; and 3) consequences of use (significant versus no significant negative effects, as defined by the individual himself). A questionnaire including measures of drug-using behavior and social psychological variables was administered in the fall and the following spring. The latter variables included: expectations for attainment of such goals as academic recognition, love and affection, and independence; locus of control; attitudinal tolerance of deviant drug use; positive functions of drug use; negative functions of drug use; and social support for use.

Several analyses were performed, with the following results, for the locus of control measure: 1) internal locus of control was associated with greater frequency of cannabis use in the autumn but not the spring; 2) there was a tendency, not statistically significant, for autumn locus of control to predict spring frequency of cannabis use; 3) regular (stage 4) drug users had become significantly more internal in their locus of control in the spring than they were in the fall; 4) persons who reported adverse consequences of drug use in the fall (but not the spring) were likely to be more internal; 5) locus of control contributed in a minor way to multivariate prediction of frequency of cannabis use over the academic year; and 6) social support for use (availability of models for use, presence of positive social reinforcement for use, absence of negative reinforcement for use) was a far more powerful variable than locus of control in predicting patterns of drug use.

In a recent personal communication, Sadava (1975) reported that based on longitudinal data for 375 students, students who use drugs daily, if they can obtain a supply, are more internally oriented than those who use moderately. Over time, daily users change toward internality. Locus of control scores were more significantly internal in a fall testing for students who began using drugs during the academic year than for students who remained nonusers. Dr. Sadava is currently preparing a report on abusive patterns of use.

In an investigation seeking to predict differential outcome in methadone maintenance programs and now nearing completion, Plumb, D'Amanda, Nichols, and Taintor studied a total of 290 heroin addicts in considerable detail. When initially assessed, 30 of the subjects were receiving treatment in an eight-day detoxification program while the remainder were enrolled in one or another of seven methadone maintenance programs in four cities. By sex and race, the distribution of the sample was as follows: 71 white males, 92 black males, 38 white females, and 89 black females. The average age of the group was about 27 years, while, on the average, six-and-a-half years had elapsed since the subjects had begun using heroin by vein.

A large number of small but statistically significant correlations were found between I-E scale scores and the broad range of other variables examined; only a few of these correlations will be mentioned here. Externality was associated with higher scores on the Beck Depression Inventory for both sexes and also with all four subscales of the Collett-Lester Fear of Death and Dying Scale for males and with Fear of Dying of Self and Dying of Others subscales for women. Correlations between the I-E and several MMPI scales were similar to those reported in other studies. Externality was negatively related to the Ego Strength, Dominance, Social Responsibility, and K scales, and positively to the F, Hs, D, Hy, Pa, Pt, Sc, Si, Dependency, and Prejudice scales. Blacks and whites did not significantly differ in their mean I-E scores, but females were significantly more external than males. I-E was not related to age, to the use of alcohol or tobacco either when high or when clean, to criminality, or to scores on the Zuckerman Sensation-Seeking or the Kurtz Body Attitudes scales.

Depending on which data are selected for comparison purposes, the mean I-E score for the entire sample and for each of the groups may be seen as similar to normal groups or may be regarded as reflecting externality. The subgroup of males undergoing detoxification had scores nearly identical to those for 103 males enrolled in methadone maintenance programs. These scores are shown in the table.

MEAN I-E SCORES OF HEROIN ADDICTS
(Plumb, D'Amanda, Nichols, & Taintor)

Group	N	Mean	SD
Males	163	10.42	3.38
Females	127	11.34	3.87
Whites	109	10.72	3.76
Blacks	181	10.89	3.55
White males	71	10.23	3.58
Black males	92	10.57	3.20
White females	38	11.63	3.90
Black females	89	11.22	3.84
Males, detoxification	30	10.66	3.08
Males, methadone	103	10.80	3.95

Of major interest to the investigators was the relationship between I-E scores and measures of outcome. In order to evaluate success or failure of treatment, subjects at follow-up were rated on several criteria: antisocial behavior, employment, interpersonal relationships, emotional status, financial status, educational achievement, and substance abuse. Two composite measures were also developed. The "Success #1" measure merely summed numerical scores on the several separate criteria, and this sum was then translated into a rating on a scale of 1 to 5, where 1 represented clear-cut failure, 2 a probable failure, 3 a doubtful outcome, 4 a probable success, and 5 a clear-cut success in terms of the relatively short follow-up time involved. "Success #2," perhaps a more meaningful score, took into account, on the 5-point rating, not only the relationships among the several criteria but also the specific characteristics and policies of the program in which the subject was enrolled, the length of the enrollment, and the length of follow-up time. Ratings reflected the combined judgments of experienced clinicians in weighing all of the follow-up evidence.

I-E scores were significantly and negatively correlated with the Interpersonal Relations criterion and with "Success #2." To put this finding in perspective, it must be recognized that the correlations were extremely low ($r = -.140$ and $r = -.128$, $p < .05$) and that other measures, including the F scale of the MMPI, were related to several outcome criteria. At the present writing, statistical analyses are still in progress and it is not yet known how I-E scores may enter into multivariate predictions.

Summary of Studies of Opiate and Other Drug Users

Efforts to interpret the results described above are complicated by the fact that some samples were drawn from college groups, some from youthful polydrug abusers of lower socioeconomic status, some from confirmed opiate addicts of various ages, some from groups who were incarcerated or awaiting legal disposition, some from mixed racial samples, some from single sex samples and some not, and so on.

Whether or not abusers or addicts look internal or external, however, obviously depends on the comparison data utilized. The findings of Robinson and Plumb, et al., for example, would characterize confirmed addicts as similar in locus of control mean scores to many college student samples reported in the broader locus of control literature and probably more external than the general population which is just beyond college or in early middle age. The Obitz, et al., polydrug abusers are said to be more external than several specified comparison groups, but the latter groups were somewhat older than the polydrug abusers. Nowicki (personal communication, 1975) has indicated that his studies and those of his associates find drug use generally to be associated with greater externality. The present authors conclude that it is probably futile to worry about such comparisons except in the context of longitudinal studies which make repeated administrations of a locus of control measure to both subjects and controls. Sadava's study meets this requirement, while other studies which may do so are only now beginning to appear in the literature.

The Jessor, Jessor, and Finney (1973) report of a longitudinal study of high school and college students (apparently an extension of the 1972 Jessor, Collins, and Jessor work noted earlier) does not mention a conventional locus of control measure, although it does include a measure of alienation which may be related to generalized expectancy of locus of control as well as measures of more specific expectancies. In a recent personal communication, Shirley Jessor confirmed that the conventional measure had not in fact been found very useful by this group.

A second point to be noted is that there now exists a growing body of literature indicating that I-E scores are sensitive both to situational stress and its relief as well as to changes accompanying, if not due to, psychotherapeutic interventions of several kinds (Harrow & Ferrante, 1969; Nowicki & Barnes, 1973; Dua, 1970; Gillis & Jessor, 1970; Smith, 1970; Berger & Koocher, 1972; Kielbauch, 1968; Jeffrey, 1974; Hamid & Flay, 1974). In the case of formal therapeutic interventions, what is shown is a shift toward internality. The studies of Coghlan and Gold (1974) and Drasgow, et al., (1974) hint that this may also be the case for at least some drug or alcohol abusers improving in treatment. In addition, there is quite good evidence (Strassberg & Robinson, 1974; Plumb, et al., in preparation) that internality is associated with a better level of adjustment among opiate addicts, at least as adjustment is measured by the MMPI and the Tennessee Self-Concept scales.

The problem is to find a fit between such findings, and findings suggesting that internality increases with length or amount of drug involvement (Calicchia, 1974; Sadava, 1973). While Plumb, et al., found that externality was greatest in black female addicts who also had a longer average history of addiction than other groups in their study, there is no way to know whether the black female addicts' scores were more internal for them than would have been the case at an earlier point in time; thus, these data are not fatal to the idea that longer history of drug involvement implies greater internality.

Perhaps an answer can be found in terms of a self-medication theory of drug abuse/addiction. This theoretical position conceptualizes the individual as seeking to alleviate some distressing affective state or otherwise to alter a world he dislikes; heroin may then be seen as the supermedication of them all, as evidenced by the fact that it often comes to be preferred to other drugs. Once he has medicated himself, the individual may be able to function reasonably well except for the problems of social disapproval and legal entanglement he encounters. Such conflicts may themselves perpetuate the need for medication but finally will create one or more crises which are insurmountable (e.g., the individual cannot obtain the needed supply; he is disowned by family; he is arrested). At that point the individual again feels distressed until his difficulties are resolved, perhaps through entering a treatment program which provides substitute medications and/or psychological supports. Under these circumstances, the individual may once more see himself as having some control over his reinforcements.

All of the foregoing, of course, is highly speculative and rather forced. However, what is suggested is that the locus of control score of the drug user/abuser at a particular point in time may be a joint function of his generalized expectancy and of the adequacy with which his needs are met, whether through drugs or through other systems of support.

A third and major question is whether locus of control measures appear to be useful for the prediction of drug using/abusing behaviors. It is obvious that the information requirements of the clinician who must make practical decisions affecting the disposition of individuals are not the same as the requirements of the behavioral scientist concerned with constructing theories of behavior. The question considered here is not how well locus of control measures are able to forecast laboratory findings, but rather whether such scores have significant diagnostic and prognostic utility at the present time to warrant their widespread use by clinicians or by public policy makers concerned with drug abuse prevention or treatment programs.

The evidence of Strassberg and Robinson is that locus of control measures do not have such utility since scores will not discriminate between persons who do and do not enter programs and who do and do not abscond from them. Robinson's 1973 report is slightly more encouraging. Calicchia's evidence is indirect but suggests that I-E scores may be related to choice of treatment modality. Sadava's work indicates some minor utility for predicting progressive and more serious involvement, while the experience of the Jessors is that conventional I-E measures are of little help. Nowicki reports enthusiasm. The findings of Plumb, et al., again hint that scores may have some predictive value since externality in their subjects had a low negative correlation with a composite index of treatment outcome. I-E in the Plumb, et al., investigation appears to be most predictive for Black males. Finally, in several studies, other predictors were much more powerful.

The returns are by no means all in. However, given current data and assuming that there is a definite limit to the information which can be collected for any group, it is obvious that I-E scores should not be collected first.

Finally, it may be said that use of locus of control measures has generated some interesting hypotheses about the belief structure of the individual who progresses to serious drug involvement. Data are still very sparse, and much work is needed to understand how general expectancies interact with actual and immediate experience to affect the behavior of various groups of persons. While many investigators, both in the area of substance using/abusing behaviors and in other areas, seem to be disaffected with the I-E Scale, and some have perhaps misused it, no one is saying that how the world and the self are perceived does not matter. In the opinion of the present authors, the generalized and specific control expectancies of chemical substance users and abusers should continue to be investigated from this point of view.

SUMMARY

In reviewing the massive and conflicting literature on locus of control, perhaps a resolution can be found in terms of a self-medication theory of drug abuse/addiction. This theoretical position conceptualizes the individual as seeking to alleviate some distressing affective state or otherwise to alter a world he dislikes; heroin may then be seen as the supermedication of them all, as evidenced by the fact that it often comes to be preferred to other drugs. Once he has medicated himself, the individual may be able to function reasonably well except for the problems of social disapproval and legal entanglement he encounters. Such conflicts may themselves perpetuate the need for medication but finally will create one or more crises which are insurmountable (e.g., the individual cannot obtain the needed supply; he is disowned by family; he is arrested). At that point the individual again feels distressed until his difficulties are resolved, perhaps through entering a treatment program which provides substitute medications and/or psychological supports. Under these circumstances, the individual may once more see himself as having some control over his reinforcements. All of the foregoing, of course, is highly speculative and rather forced. However, what is suggested is that the locus of control score of the drug user/abuser at a particular point in time may be a joint function of his generalized expectancy and of the adequacy with which his needs are met, whether through drugs or through other systems of support.

Finally, it may be said that use of locus of control measures has generated some interesting hypotheses about the belief structure of the individual who progresses to serious drug involvement. Data are still very sparse, and much work is needed to understand how general expectancies interact with actual and immediate experience to affect the behavior of various groups of persons. While many investigators, both in the area of substance using/abusing behaviors and in other areas, seem to be disaffected with the I-E Scale, and some have perhaps misused it, no one is saying that how the world and the self are perceived does not matter. In the opinion of the present authors, the generalized and specific control expectancies of chemical substance users and abusers should continue to be investigated from this point of view.

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BEHAVIORAL AND DEMOGRAPHIC CORRELATES OF DRUG USE AMONG STUDENTS IN GRADES 7-12

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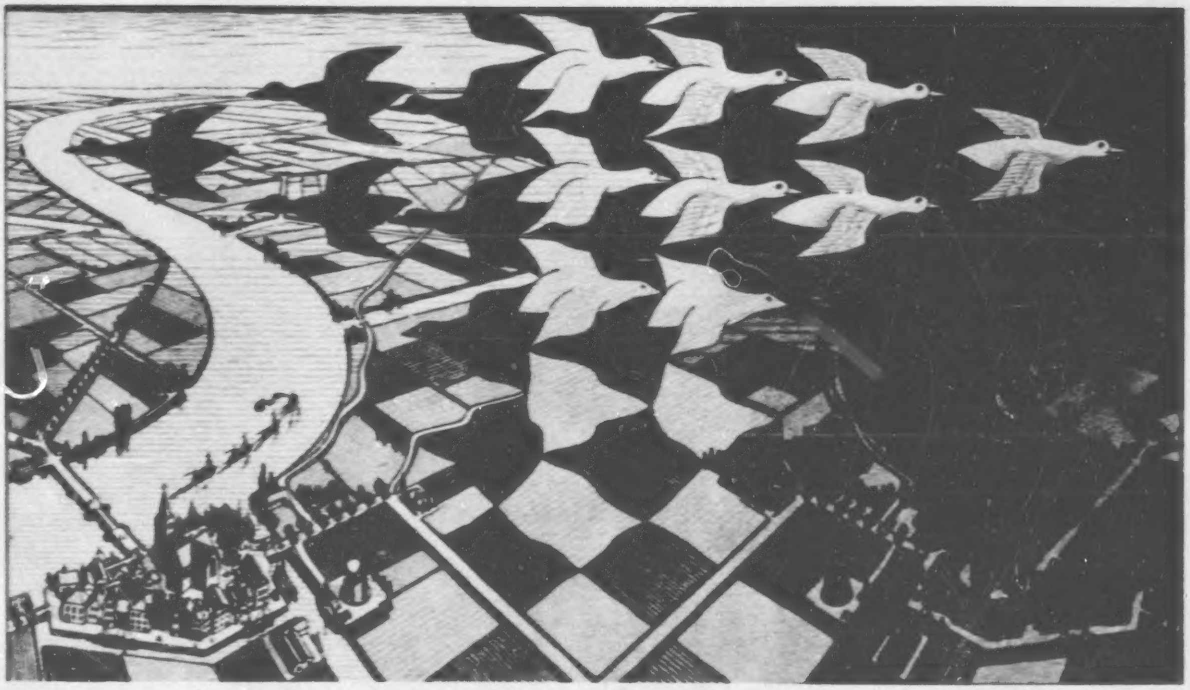

Plate 16

BEHAVIORAL AND DEMOGRAPHIC CORRELATES OF DRUG USE AMONG STUDENTS IN GRADES 7-12

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This paper represents an extended analysis of data reported elsewhere (Block, Goodman, Ambellan and Revenson, 1974). To place the present analyses in perspective, it is necessary to review the purpose, procedures, and general findings of the earlier report.

From the beginning that investigation was envisioned as a "feasibility" study. The issue was whether or not a standardized self-administered questionnaire could be completed by students of varying socioeconomic levels in different parts of the country and in different "types" of senior and junior high schools (grades 7 through 12). Thus, the focus of the earlier investigation was not on the collection and analysis of data but rather on whether or not such data could be reasonably collected. However, the authors of that report argued that sufficient data must be collected not so much to demonstrate the feasibility of the project but to provide a reasonable incentive for schools to cooperate. The authors offered to report individual school results as well as "normative" data for the geographic region and type of school. Anticipating probable cross-tabulations, this meant that each school could not have a sample size too small to have any potentially and locally useful information. Thus, although the feasibility of administering the questionnaire and obtaining reasonable replies from a variety of settings was the primary goal, it was necessary to collect a reasonable amount of data in order to demonstrate that the first step (cooperation of the schools) was feasible.

In order to test the feasibility under a variety of conditions, ten cities were chosen. Two each were located in the Northeast, the Southeast, the Midwest and the West Coast; one was located in the Southwest and one was located in the Pacific Northwest. Approximately half of the ten cities were defined as "major" cities with populations of over 500,000. The others might be called "minor" cities with populations ranging between 125,000 and 400,000. Within these cities attempts were made to test the feasibility of self-administration in a variety of different "types" of schools. (A more detailed description of the rationale for choosing schools and reasons for participation or refusal is presented in the larger report.) In the final analysis 79 schools were included. Of these schools, 36 were urban, 26 suburban, 6 rural, 3 vocational, 2 private and 6 parochial.

It was clearly not within the scope of the study to select schools which were necessarily representative of either their city or type; rather, they were selected to represent a high degree of variability. Data presented in the larger report, therefore, must be treated with extreme caution in terms of incidence since neither the high schools nor the cities were randomly selected. However, once a school was included, students were selected by choosing academic subject matters and class periods which would be likely to be representative of the school in question. Data as presented in the original report indicate that the samples within schools were representative of the school population, at least in terms of sex and ethnic mix. Thus, while samples of students were representative of their schools, the schools were not necessarily representative of either city or type. It follows, then, that the aggregate of schools is not necessarily representative of junior and senior high schools across the continental United States. Despite this, for reasons to be detailed later in this report, Block, et al., (1974) believe there is some justification for combining the results of all students. In all, the study obtained usable data from a total of 9,048 students.

The questionnaire used included almost 300 separate pieces of information. Of these, approximately 25% of the items dealt with demographic and background variables of the respondents. Another 50% covered experience with and attitudes toward illicit drugs, focusing primarily on eight drug categories comprised of marihuana or hashish, LSD, other hallucinogens, amphetamines, barbiturates, nonbarbiturates, opiates, and inhalants. The final 25% dealt with knowledge of and experience with a combination of various forms of alcohol (beer, wine, and hard liquor), cigarettes, and a variety of forms of over-the-counter medicines or medicines used for a wide range of physical ailments. By and large it was determined that the instrument could be successfully completed in a typical academic period (approximately 40-45 minutes), with an average of about 12% of the students failing to fully complete the questionnaire (some shortening of the instrument is recommended for future work).

This subsequent report presents data relating primarily to demographic variables and relating to the consumption of other substances (alcohol, tobacco, or over-the-counter medicines). It omits data with regard to experience with or attitudes toward the eight categories of illicit drugs mentioned previously. While the originial report presented certain data with regard to incidence of drug use, it did so urging the utmost caution in view of the inadequacies inherent in the sampling beyond the school level. Nonetheless, a certain behavioral pattern did seem to emerge that would distinguish between those who were present users of illicit drugs and those who had never had such experience.

In the original report students were classified into one of three categories: those who had never had experience with illicit drugs, those who acknowledged a present use of at least one illicit drug, and those who acknowledged having had such an experience with one or more illicit drugs but who denied present involvement. Thus, those who were "present users" had to acknowledge that at one time or another they had used any of the drug categories enumerated above and, in addition, were presently using one of those categories; those who were "never users" had to declare that they had never had any experience with any of the drug categories nor were they presently involved; while those who were classified as "former users" had to acknowledge some experience with any of the eight drug categories at some time but were not presently involved with any of the eight categories. The frequency or intensity of use of drugs was not considered in the definition, nor was any distinction made with regard to the specific drug categories used.

In analyses performed subsequent to the publication of the original study, it was determined that 93% of the present drug users were involved with marihuana and only 7% reported using drugs other than marihuana. Of the total group of drug users, 52% were using marihuana exclusively and 41% were using marihuana combined with one or more of the other seven drug categories. (Data with regard to former drug users was not analyzed.)

Comparing present drug users with those who had never had any experience with any of the eight drug categories, a large number of statistically significant findings emerged. The overwhelming proportion of these were significant well beyond the .001 level. Furthermore, the pattern of responses distinguishing between present and nonusers seemed to hold quite consistently across each of the ten cities and hold just as well when the data were recast into each of the six types of schools. Superficially characterizing the overall results, it could be said with some confidence that drug users were more likely to have had some experience with each of the three forms of alcoholic beverages; and, when only "drinkers" were compared for each type of beverage, the drug users drank more heavily than their drug-free counterparts. Further, it could be clearly demonstrated that drug users who drank were more likely to get "high" more often than their drug-free counterparts who also drank.

A highly similar pattern was found for smoking cigarettes: drug users were far more likely to smoke and, among those who smoked, drug users smoked more heavily than drug nonusers. Similar differences were found for the use of a wide variety of over-the-counter medicines and the consumption of medication for a wide variety of physical ailments ranging from headaches and pain other than headaches through coughs, colds, and upset stomachs, and on to allergies. The absolute percentage difference for the over-the-counter medications was not as dramatic as for the consumption of alcohol and cigarettes, but the difference tended to be consistently significant beyond the .001 level. As a modest illustration, students were asked about their use of each of 17 relatively common over-the-counter medicines. This data analyzed across ten different cities resulted in 170 possible comparisons. Of these, only 36 failed to reach significance even at the .05 level, and 103 yielded significance values well beyond the .001 level.

Other consistent response patterns suggested that drug users tended to be more likely to be alienated from their family, church, and school than drug nonusers. Less dramatic findings related to socioeconomic issues, race, sex, and religious affiliation, although each of these did show some trends. There was a highly significant difference in age between the drug users and drug nonusers, with those involved in the illicit use of drugs averaging more than one year older than those not so involved. To control for this possible source of bias, in analyses conducted after the publication of the original report data for the over 9,000 subjects was recast into one-year age levels ranging from 12 years or less to 18 years of age or older. While the magnitude of the differences was reduced, the significance of the findings nonetheless remained substantial and were consistently explainable by chance less than one time in a thousand.

In view of the magnitude of the differences between drug users and drug nonusers and the consistency of results whether the data was presented by city, type of school, or by age, Block, et al., (1974) decided it was reasonable to combine results of all respondents provided that the absolute levels of response were not interpreted with too much precision.

Most immediately relevant to the present paper is the issue of which of the variables investigated contribute most heavily as correlates of drug use. For this report it was decided that all three of the drug user categories would be examined (never users, present users, and former users). To undertake this analysis a stepwise discriminant function analysis (DFA) was performed. This was done using the program developed by the UCLA Health Sciences Computing Facility, performed with the most helpful support of the Hofstra University Computer Center.

One problem with conducting such an analysis is that data must be available for all variables for all subjects. Thus, each time a student failed to respond to any item that student had to be eliminated from further analyses, even though it might only be one of the several variables under consideration. The problem was compounded still further by the fact that certain variables which might be of interest (e.g., family income) could not be consistently "scaled" since at least one response alternative was "don't know." Thus, if one were to assign a series of values to each of the seven class intervals for family income, it would be unreasonable to assign a numerical value to the "don't know" response. In this illustration alone, eliminating those students who responded "don't know" would have resulted in a reduction by 30% of the original sample of over 9,000.

Further, certain format problems in the original questionnaire resulted in students omitting responses to certain items while completing others of equal conceptual difficulty. On the basis of these experiences, the present author elected to omit certain items from the discriminant function analysis, not so much on the basis of a lack of interest about the contribution of these items but rather with the concern that including them might seriously reduce sample size or bias it in some other fashion. Even with these exclusions, including 29 variables resulted in a 53% sample attrition in the analysis. The interested reader is referred to the original report, which does deal with the association of the omitted variables and the present use of illicit drugs to make maximum utilization of the data originally collected.

In order to provide for the greatest generalization, the total original group of respondents was separated by sex. In addition, an attempt at "cross validation" was undertaken. Thus, once all of the males had been pulled from the total records, separate analyses were done for odd-numbered versus even-numbered males. It was decided that it was better to have two independent samples of "half size" than one larger sample.

Variables included in the analyses are listed in Table 1. The number of parentheses following the variable label represents the number of class intervals. The variable "number" is used in reporting the results.

Table 1
Variables Used in DFA

1. Age (8)
2. Grade point average last year (5)
3. Use of beer (4)
4. Use of wine (4)
5. Use of hard liquor (4)
6. Number of times "high" on alcohol (7)
7. Use of cigarettes (8)
8. Use of medicine to relieve a headache (5)[a]
9. Use of medicine to relieve coughs or colds (5)[a]
10. Use of NoDoz (5)
11. Use of Compoz (5)
12. Use of Cope (5)
13. Use of Sominex (5)
14. Use of Nytol (5)
15. Use of Sleep-eze (5)
16. Use of Aspirin (5)
17. Use of Anacin (5)
18. Use of Excedrine (5)
19. Use of Bufferin (5)
20. Use of Robitussin (5)
21. Use of Romilar (5)
22. Use of Terpin Hydrate (5)
23. Use of Cheracol (5)
24. Use of Cosanyl (5)
25. Use of Endotussin (5)
26. Use of Dramamine (5)
27. Frequency of attending religious services (4)[b]
28. Degree of belief that student's mother "trusts" student (5)[c]
29. Degree of admiration and respect for mother (5)[c]

---

[a] While data was collected concerning medication for 12 "ailments," either as a result of question format or of very low rates of perceived need for medication, between 20% to 25% of the students failed to respond to most of these items. The two ailments chosen were selected in order to explore at least part of the issue reflected by the items and because only 8% failed to respond to variable No. 8 (headaches) and 14% to variable No. 9 (coughs and colds).

[b] Students were also asked to indicate the "importance" of religion to them. Five response categories were available, including "not sure." This item was not included in the DFA since 11% used this response category and data in the original study suggested that the two items would be highly correlated.

[c] The fifth response category was "mother not living." However, since only 19 out of over 9,000 respondents checked this category, it was retained for the analysis. By way of explanation, items comparable to variables No. 28 and No. 29 for "father" were not included in the analysis since almost twice as many students omitted this item, apparently as a result of

item format. In addition, the statistical analyses in the original report indicated highly similar findings for "mother" and "father."

Additional variables were included in the original questionnaire which were similar in character to those listed here and have not been discussed in the footnotes. The utility of these variables will be discussed after attempts are made at interpretation of the DFA.

DISCRIMINANT FUNCTION ANALYSES

The primary purpose of the DFA is to determine the relative contribution of the various variables in determining whether a student was one who had never used drugs, was presently using them, or was a former drug user. The research methodology intended for this paper involved separating groups by sexes and cross validating between odd numbered or even numbered males and females, respectively. This would provide some indication of the generalized ability of the importance of each variable and would also permit comparisons between sexes.

For all four computer runs, all 29 of the variables entered into the analyses and the program indicated that there was still sufficient unexplained variance which to some degree, albeit probably insignificant, might be accounted for by the addition of each variable. As a first analysis, interest was in the rank correlation of the order of entry of each of the 29 variables for each of the four groups (Table 2). For additional information the reader is referred to Appendix A, which contains the initial F values and sequences of entering the DFA for each variable.

Table 2
Rank Order Correlations of Sequence
of Variable Entry (First DFA)

	Odd Male	Even Male	Odd Female	Even Female
Odd Male	--	.65	.44	.53
Even Male		--	.31	.34
Odd Female			--	.03
Even Female				--

In order for a rank order correlation to be significant at the .05 level, correlations of at least .31 are required with N of 29. The correlation of .03 for the two groups of females was especially striking and puzzling. In an effort to understand it, the mean values for each of the 29 items, for each of the three classifications of users, and for the "total group" for both groups of females were considered. Taking all four possible comparisons, there were 116 pairs of mean values. Of these only 12 differed by more than .2 of a point, and of those 12 only three differed by as much as .3 of a point.

One explanation considered revolved around the fact that variables 10 through 26 inclusive, all referred to the use of specific over-the-counter medicines. Each showed relatively little variability, although the data in the original report indicated that the great majority showed differential use patterns between the user and nonuser groups. With relatively small F values remaining after the inclusion of major factors in the DFA, it seemed probable that negligible differences alter the rank order of entry quite substantially.

To partially test this, the DFA summing the values for variables 10 through 26 and treating the sum as a single variable was re-run. This did result in some slight improvement in the correlations, as indicated in Table 3 (although there was a marked reduction between odd-numbered males and even-numbered females). Recognizing that there were only

13 variables as opposed to 29, the suggested explanation did not appear to carry much weight. At least superficially, it appears that the "even females" were odd.

Table 3
Rank Order Correlations of Sequence
of Variable Entry (Second DFA)

	Odd Male	Even Male	Odd Female	Even Female
Odd Male	--	.70	.67	.16
Even Male		--	.65	.47
Odd Female			--	.15
Even Female				--

To examine the problem further, the rank order correlations of the initial F values for all variables were computed. These were presented in Table 4.

Table 4
Rank Order Correlation
Initial F Values Variables

	Odd Male	Even Male	Odd Female	Even Female
Odd Male	--	.88	.82	.91
Even Male		--	.86	.92
Odd Female			--	.89
Even Female				--

As can be seen by inspection, the F values were highly similar across all four groups and provided a very different picture of the relative importance of each.

Using the DFA as calculated and according to initial F values, one variable accounted for the greatest proportion of variance in all four groups. Specifically, this was variable No. 6 relating to how often the student reported getting "high" or "bombed" on alcohol. In addition, in terms of the sequence of entering the equation, variable No. 7 (the use of cigarettes) was entered second in all four groups, although it did not always rank second in terms of initial F values since intercorrelations between variables affected the sequence of entering by having already accounted for certain proportions of the variance of each other item.

The pattern of entry into the DFA stopped yielding perfect consistency after these two variables. However, variables No. 3 (the use of beer) and No. 5 (use of hard liquor) had initial F values ranking between second and fourth, depending on the specific analytic group considered. Finally, variable No. 4 (the use of wine) ranked fifth in all four groups in terms of initial F values. Variable No. 3 (the use of beer) entered the equation making a statistically significant contribution for three of the four groups (the exception was odd-numbered females). Variable No. 4 (use of wine) added significantly to the odd-numbered males and the odd-numbered females; and variable No. 5 (use of hard liquor) added significantly to both the even-numbered males and the odd-numbered females. The only other variable which added significantly in all four groups was age. Grade point average added significantly to the analysis, both "even" groups falling just short with the odd males but being entered at the 27th step for the odd females. Further, frequency of attending religious services added significantly in both of the female groups and fell just outside of a significant contribution for both male groups.

Finally, Table 5 indicates the classification of cases according to the discriminant function analysis as performed for each of the four groups when 3 classification categories are used.

Table 5
Classification of Subjects into 3 Groups by DFA

	Odd Males	Classification*				Odd Females	Classification		
		N	U	F			N	U	F
Group	N	310	35	92	Group	N	443	32	124
	U	37	239	105		U	43	234	82
	F	45	34	68		F	56	46	86
	Even Males	Classification				Even Females	Classification		
		N	U	F			N	U	F
Group	N	338	35	121	Group	N	406	42	138
	U	28	250	81		U	35	238	69
	F	51	34	79		F	65	35	79

* N = Never User; U = Present User; F = Former User

The diagonal categories going from the upper left to lower right represent "hits." When three classifications were used, the present discriminant function analyses yielded 63.9% correct classifications for the odd males, 65.7% for the even-numbered males, 66.6% for the odd females and 65.3% for the even females. The percentage improvement in the classification resulting from the DFA can be indicated by the index of predictive association, sometimes called lambda (Hayes, 1963). For the odd males there was a 58% improvement in identifying the subjects' classification knowing the results of the DFA for the even-numbered males; for the even-numbered males lambda indicated 41% improvement. For the odd females the value was 37% and for the even females, 38%.

If one were simply interested in whether or not a student had ever tried drugs rather than in making a distinction between present versus former use, the effectiveness of the DFA can be seen by combining the present user and former user group, resulting in the data presented in Table 6.

Table 6
Classification of Subjects into Two Groups by DFA

		Odd Males Classification				Odd Females Classification	
		Never Used	Ever Used			Never Used	Ever Used
Group	Never Used	310	127	Group	Never Used	443	156
	Ever Used	82	446		Ever Used	99	448
		Even Males Classification				Even Females Classification	
		Never Used	Ever Used			Never Used	Ever Used
Group	Never Used	338	156	Group	Never Used	406	180
	Ever Used	79	444		Ever Used	100	421

With fewer categories to predict, the percentage of "hits" increased such that the odd males had 78.3% correct classifications, even males 76.9%, odd females 77.7%, and even females 74.7%. The lambda values (interpreted as percent of improvement) for each of these were, respectively, odd males 66%, even males 52%, odd females 53%, even females 46%.

OTHER VARIABLES

It is important to consider those variables which might make a contribution to classification and which were in the original questionnaire but were not included in the DFA. Taking these in the order in which they appeared in the original questionnaire, the first would include expected plans after finishing high school. In five of the ten cities and four of the six school type categories, the original report found significant differences in the proportions of drug users and nonusers among those who intended to go on to two- or four-year college programs. Combining the data for all subjects, 60% of the nonuser group intended to go on to college while 53% of the user group reported such intentions. The t-test for these percentages was 5.84, which was significant beyond the .001 level. The variable was not included since it was assumed that this would be relatively highly correlated with grade point average (variable No. 2) and the fact that it was difficult to scale the variety of response alternatives to the question.

Another factor which might have promise for identifying drug users is the age at which students reported first trying beer, wine, hard liquor, or cigarettes. In the original analyses, no consistent differences in the age of first trying the substances was found between drug users and nonusers. However, when the data was analyzed holding the age of the respondent constant, there was some evidence that drug users might have their first exposure at an earlier age than nonusers. This pattern was not as clear when drug nonusers were compared with different "types" of drug users, specifically those who used marihuana only, those who used marihuana in addition to another drug, and those who were using a drug other than marihuana. Perhaps more importantly, a large percentage of students had never used alcohol, and thus it would be impossible to scale age. Religious affiliation was not included in the DFA since the original report showed only weak relationships with this variable; also, it could not be scaled as were the other variables. A similar decision was made with regard to race since the variable did not appear to be highly related to drug use, although there was some tendency for the drug group to have a higher proportion of white students.

Several variables relating to socioeconomic position of the family also were not included. These included parents' educational level, the occupation of the head of household, and family income, discussed earlier. The original study showed some slight tendency for occupation of the head of the household and family income to be related to drug use; a less clear pattern showed with regard to parents' educational level. In each case the relatively weak relationship as well as the substantial number of students who either did not respond to the question or responded "don't know" resulted in the decision that it be left out of the DFA.

The original study indicated significant differences between user and nonuser groups on the basis of whether or not students held part-time jobs. These data were eliminated from analyses on the basis of the substantial proportions of students who failed to answer the question (approximately 25%). Finally, variables including number of siblings and birth order were found in the original study to be unrelated to drug use; thus, these were not included in the DFA.

SUMMARY

The most important single factor contributing to an understanding of major differences between drug users appears to be the extent to which they use alcohol to get "high." The second most important factor seems to be the extent to which students between grades 7 and 12 smoke cigarettes. Ranking immediately after these factors one finds the use of beer, wine and hard liquor. These results are consistent with the original report. Indeed, analyses conducted after the original report and to be reported separately in a supplement to it suggest that while drug users are deviant from a drug-free population on these dimensions, users of marihuana and another drug are significantly more deviant in the same direction from those students who use marihuana only. Another important variable appears to be age since it entered the DFA relatively early and ranks relatively high in terms of the initial "F" contribution. On the other hand, analyses holding age constant within one year, performed subsequent to the original report, suggest that while this variable accounts for some of the variance, the essential behavioral and attitudinal differences between drug users and nonusers exist independently of age.

What comes out less clear in the present analyses (but which still may be important) are pieces of information relating to the students' sense of identification with school, family, and church. Grade point average did appear to have some important contribution, even in the present DFA; and there was a suggestion of some relationship between drug use and attitudes towards the family and church, although these were clearly less marked.

The use of medication for "ailments" could not be investigated in depth because of the relatively large numbers of students who failed to respond adequately to the question in terms of the need for the discriminant function analysis to know all information for all subjects. Data presented in the original report suggest such use of medication might also make an important contribution to the analyses. Finally, the reported use of specific over-the-counter medicines was found to be important in the original report; however, it seemed to represent a statistical artifact in this first discriminant function analysis.

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FOOTNOTES

1. Data reported here were collected under NIDA Contract No. NO-1-MH2-137.

APPENDIX A

Variable	Initial F (Rounded to Units Column)				Step Entered			
	Odd Males	Even Males	Odd Females	Even Females	Odd Males	Even Males	Odd Females	Even Females
1. Age	48	35	24	28	4	5	7	7
2. GPA	19	16	9	22	8	8*	27	9*
3. Beer	175	170	175	175	5	6	20	5
4. Wine	115	94	123	92	3	12	6	23
5. Hard Liquor	149	171	162	159	9	3	4	17
6. High	257	304	326	325	1	1	1	1
7. Cigarettes	122	155	275	206	2	2	2	2
8. Headache	11	20	42	39	21	21	21	8
9. Coughs	5	4	21	17	15	22	13	19
10. NoDoz	23	30	64	44	14	23	5	20
11. Compoz	3	13	20	9	28	14	26	27
12. Cope	6	10	19	19	13	19	17	14
13. Sominex	5	14	22	22	24	7	18	29
14. Nytol	6	3	37	15	20	13	11	12
15. Sleep-Eze	6	9	21	19	25	29	24	13
16. Aspirin	21	38	49	41	7	4	16	22
17. Anacin	17	30	67	40	29	28	12	25
18. Excedrin	26	33	86	56	26	25	3	26
19. Bufferin	16	25	65	40	22	24	9	18

Variable	Odd Males	Even Males	Odd Females	Even Females	Odd Males	Even Males	Odd Females	Even Females
20. Robitussin	7	6	13	16	27	9	14	16
21. Romilar	13	10	24	14	19	18	15	10
22. Terpin Hydrate	4	2	8	6	18	20	23	11
23. Cheracol	3	1	9	4	23	17	10	28
24. Cosanyl	2	0	1	1	17	26	22	21
25. Endotussin	6	1	3	3	11	27	16	24
26. Dramamine	5	8	12	17	16	15	25	8
27. Attend Services	10	12	15	22	10	11	8*	6
28. Mother Trusts	23	25	29	41	12	10	28	4
29. Respects Mother	15	3	22	25	6*	16	19	15

* Indicates last step adding significantly to the classification

TEENAGE DRUG USE: A SEARCH FOR CAUSES AND CONSEQUENCES

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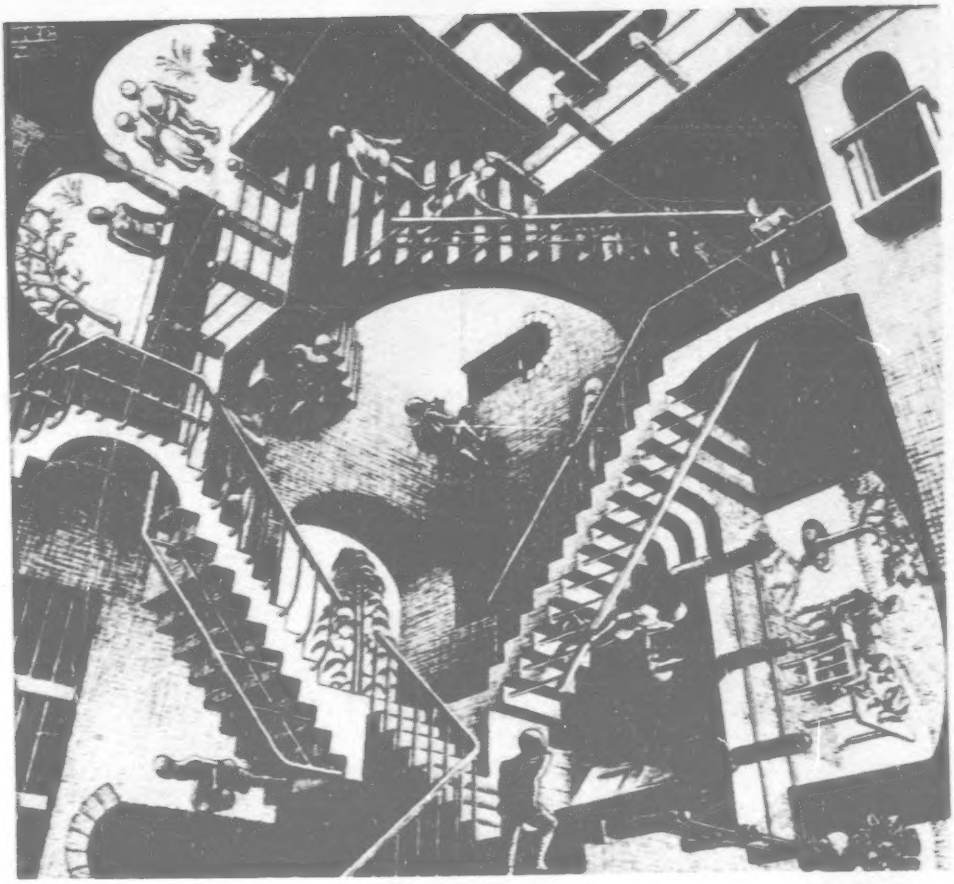

Plate 17

TEENAGE DRUG USE: A SEARCH FOR CAUSES AND CONSEQUENCES

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and

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The analyses in this report concern the relationship between early nondrug measures (grade point average, cigarette smoking, attitudes toward cigarette smoking, and personality) and later use of illicit drugs in data obtained in a five-year longitudinal study of teenage drug use. The final year of the five-year annual survey was conducted in 1973, and data analysis is still in progress; but work already completed and reported here does help clarify certain aspects of the psychodynamics of drug use.

METHODS

Subjects

The 542 students in the sample reported here were from one of six surburban Boston school systems participating in the study. The students were 7th and 8th graders in year 1 and were 11th and 12th graders in year 5 of the study. They were mostly from white, middle income families.

Procedure

In 1969, information was collected regarding personality, grade point average, cigarette smoking, and attitudes toward cigarette smoking. Personality was measured by both self-report and peer rating procedures. Information concerning grade point average was obtained from school files. Cigarette smoking was assessed by asking students whether or not they smoked and, if so, how often. Attitudes toward cigarette smoking were measured with a self-report questionnaire. In 1970, the same information, except for the peer ratings, was collected again. In the 1971, 1972, and 1973 testings, the cigarette attitude questionnaire was deleted and three drug questionnaires were added--one measuring knowledge about drugs, one concerning attitudes toward drug use, and one requesting information about past and present drug use. The results presented here deal only with the predictive relationships between nondrug variables, measured in 1969, and drug use, reported four years later in 1973.

When completing the drug use questionnaire in 1973, 104 of the 542 students in the present analysis reported that they had used at least one of the following classes of "hard" drugs at least once: opiates, hallucinogens (e.g., LSD, mescaline), stimulants (amphetamines, cocaine, or other uppers), and depressants (barbiturates, tranquilizers, or other downers); 216 reported having used marihuana but not "hard" drugs; 222 reported never having used any type of illicit drug. These three groups, formed for analysis after collection of drug use data in 1973, were then compared regarding scores on predictor variables measured in 1969.

Univariate and multivariate statistics were used to evaluate the relationship between drug use reported in year 5 and scores on each of 23 variables measured in year 1: grade point average, cigarette smoking, seven self-report scales measuring attitudes toward cigarette smoking, eight self-report scales measuring personality, and six peer rating measures of personality. The seven measures of attitudes toward cigarette smoking and the eight measures of personality were derived by factor analysis of questionnaire responses. Definitions were based on principal components rotated to simple structure using Kaiser's orthogonal varimax procedure (Harman, 1960). The cigarette attitude questionnaire contained 182 items, the personality questionnaire contained 400. Both were developed specifically for this project. The procedures which generated the six peer rating variables are described by Smith (1967).

Results

The Table reports comparisons among the three drug use groups with regard to each of 23 predictor variables. Differences among the group means were evaluated for each predictor variable with a one-way analysis of variance. As shown in the Table, 22 of the 23 predictor variables yield F values significant at or beyond the 0.05 level, and all variables except one exhibit monotonic progressions.

Compared with the users, the nonusers score high on grade point average, low on cigarette smoking, high on each of the seven measures of negative attitudes toward smoking, low on the self-report measure of "rebelliousness," high on each of the other seven personality questionnaire measures (hardworking, ambitious, self-reliant, feels capable, feels accepted, feels confident academically, likes school), high on peer ratings of "obedience," "works hard," "orderly," and low on peer ratings of "untrustworthy," "sociable," and "impulsive."

Multiple discriminant analyses were performed with a prediction battery consisting of 11 of the variables listed in the Table; viz., 1, 2, 5, 7, 10, 14, 16, 18, 21, 22, and 23. Four two-group classification analyses were performed: nonusers vs. users, nonusers vs. marihuana users, nonusers vs. hard drug users, and marihuana users vs. hard drug users. Accuracy of status assignment was 69%, 68%, 76%, and 55%, respectively, for the four comparisons just cited.

COMMENT

Four aspects of the results merit emphasis. First, the significant predictors are conceptually and methodologically diverse; grade point average, cigarette smoking, attitudes toward cigarette smoking, and several factorially distinct aspects of personality all contributed significantly to drug group discrimination. Second, for all but one of the 23 predictors, the mean scores for marihuana users were intermediate between the means for nonusers and hard drug users. Third, the self-report and peer rating measures of personality provided a reassuring degree of mutual support (e.g., rebellious and obedient, hardworking and works hard). Finally, the interval of four years, over which these predictions were made, is long; and under such circumstances many influences operate to obscure extant relationships.

Earlier demonstrations of significant associations between drug use and nondrug variables in cross-sectional analyses have not been informative concerning the genesis of those associations (e.g., Blum & Associates, 1969; Goldstein, et al., 1970; Hogan, et al., 1970; Simon & Gagnon, 1971). For example, does the positive correlation between drug use and rebelliousness result from a greater predisposition on the part of rebellious students to become users, is it due to a tendency for drug use to produce rebelliousness, or does it result from the operation of both sequences?

The predictive relationships between nondrug and drug variables found in our longitudinal analyses do not eliminate uncertainty of the sort just mentioned, but they do reduce the interpretational alternatives. Regarding rebelliousness, for example, we now know that its concurrent association with drug use is not due entirely to increased rebelliousness following upon drug use. The concurrent association, based on cross-sectional analyses, is derived at least in part from greater-than-average predisposition toward drug

DRUG USE CLASSIFICATION ASSIGNED IN 1973

Variables Measured in 1969	Nonusers			Marihuana Users			Hard Drug Users			Test of Significance	
	$\overline{X}$	SD	N	$\overline{X}$	SD	N	$\overline{X}$	SD	N	F	p
1. Grade point av.	93.50	19.50	222	89.60	20.60	216	85.30	21.10	104	5.94	**
2. Cigarette use	0.41	0.67	208	0.96	1.21	205	1.29	1.54	100	24.50	***
(Cigarette Attitudes)[1]											
3. Factor 1	2.77	0.54	208	2.56	0.53	205	2.49	0.58	100	11.82	***
4. Factor 2	3.08	0.54	208	2.90	0.52	205	2.84	0.53	100	9.20	***
5. Factor 3	3.21	0.52	208	2.97	0.59	205	2.82	0.65	100	17.43	***
6. Factor 4	2.52	0.64	208	2.37	0.64	205	2.33	0.63	100	4.27	*
7. Factor 5	3.24	0.47	208	2.96	0.50	205	2.92	0.57	100	21.32	***
8. Factor 6	3.50	0.55	208	3.19	0.70	205	2.98	0.81	100	22.98	***
9. Factor 7	2.98	0.32	208	2.83	0.35	205	2.80	0.38	100	12.85	***
(Personality Questionnaire)											
10. Rebellious	1.95	0.50	208	2.23	0.57	198	2.30	0.61	90	18.82	***
11. Hardworking	3.08	0.36	208	2.98	0.40	198	2.85	0.43	90	10.72	***
12. Ambitious	3.59	0.29	208	3.52	0.33	198	3.48	0.33	90	4.21	*
13. Self-reliant	2.84	0.44	208	2.73	0.47	198	2.73	0.54	90	3.32	*
14. Feels capable	2.83	0.50	208	2.77	0.47	198	2.60	0.49	90	7.00	**
15. Feels accepted	3.15	0.41	208	3.07	0.40	198	2.93	0.48	90	8.37	***
16. Confident academically	2.70	0.50	208	2.65	0.48	198	2.47	0.46	90	7.21	***
17. Likes school	2.89	0.51	208	2.79	0.50	198	2.67	0.55	90	5.57	**
(Peer Ratings)											
18. Obedient	+ 3.38	3.78	217	+ 1.09	4.53	205	+ 0.55	5.02	103	20.99	***
19. Untrustworthy	- 1.79	3.89	217	- 0.31	4.38	205	+ 0.32	4.84	103	10.63	***
20. Works hard	+ 2.71	4.23	217	+ 1.43	4.59	205	+ 1.10	4.52	103	6.36	**
21. Orderly	+ 2.51	4.94	217	+ 1.75	4.90	205	+ 1.17	4.62	103	2.93	NS
22. Sociable	- 0.90	4.43	217	+ 0.98	4.58	205	+ 0.40	4.49	103	9.47	***
23. Impulsive	- 1.68	3.36	217	- 0.03	3.73	205	+ 0.53	4.04	103	16.94	***

*** = .001, ** = .01, * = .05

---

[1] For each of the seven smoking attitude scales, a high score indicates an unfavorable attitude toward smoking. Factors 1-7 are designated, respectively: "views smokers negatively," "admires nonsmokers," "considers smoking repulsive," "disavows benefits of smoking," "views smoking as hazardous," "finds smokers unattractive," and "general rejection of smoking."

use on the part of students who are rebellious. Whether drug use leads to heightened rebelliousness is uncertain at present; but analyses now being performed on our five-year data base, aimed at quantifying the impact of drug use on personality, are expected to answer such questions.

The clarification of meaning just mentioned regarding the concurrent association between rebelliousness and drug use can be claimed, in parallel fashion, for the other nondrug variables shown by the present results to be predictive of drug use.

Documentation of long-term sequential relationships such as those reported here can be expected to bring us closer to an understanding of the causes of teenage drug use; and this, in turn, should result in improved programs for drug education and rehabilitation.

SUMMARY

Membership in teenage groups, classified by self-report of drug use (222 nonusers, 216 marihuana users, and 104 hard drug users), was significantly predicted from nondrug variables measured four years prior to assessment of drug use. Information concerning predictor variables was obtained from school records, self-report by students, and peer ratings. Compared with drug users, nonusers scored high on grade point average, low on cigarette smoking, and high on negative attitudes toward cigarette smoking. Regarding personality, the nonusers scored low on rebellious, untrustworthy, sociable, and impulsive, and scored high on hardworking, ambitious, self-reliant, orderly, likes school, feels accepted, feels capable, and feels confident academically.

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PREDICTING TIME OF ONSET OF MARIHUANA USE:
A DEVELOPMENTAL STUDY OF HIGH SCHOOL YOUTH

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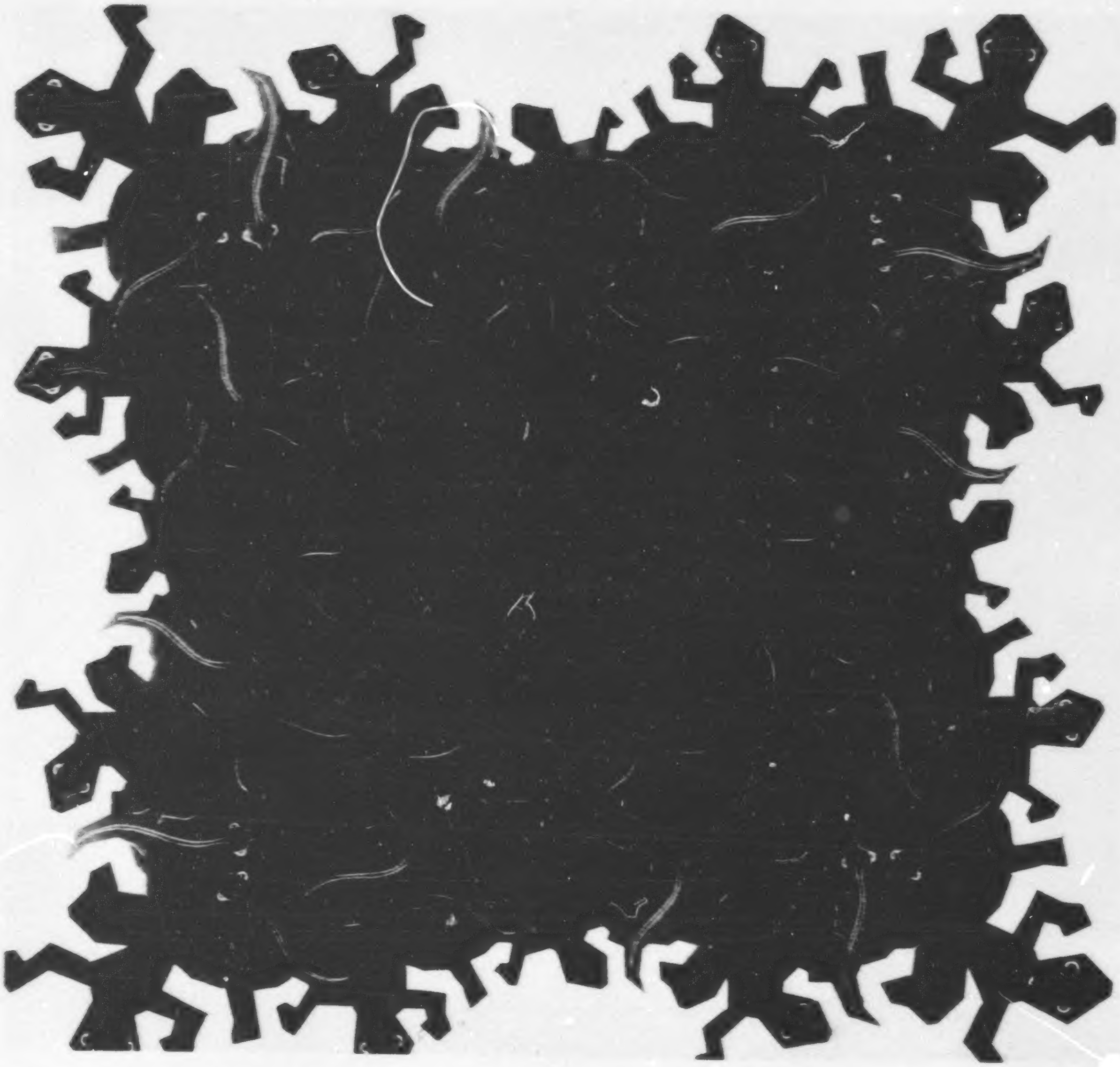

Plate 18

PREDICTING TIME OF ONSET OF MARIHUANA USE: A DEVELOPMENTAL STUDY OF HIGH SCHOOL YOUTH

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This report is on the use of a social psychology of problem behavior to account for onset and for variation in time of onset of marihuana use among high school youth. It represents an effort to go beyond epidemiological and descriptive studies of prevalence; instead, it seeks to embed marihuana use in a theoretical framework that enables systematic prediction of its occurrence and that reveals the relationship of its occurrence to adolescent development as a whole. Since the framework has been described elsewhere (Jessor, Graves, Hanson, & Jessor, 1968; Jessor & Jessor, 1973a, 1973b; Jessor, Collins, & Jessor, 1972; Jessor, Jessor, & Finney, 1973; Jessor & Jessor, 1974, 1975; Rohrbaugh & Jessor, 1975; Weigel & Jessor, 1973), and since the very same paradigm has recently been applied to the onset of drinking (Jessor & Jessor,1975a), only a brief introduction will be given here.

The concept of "problem behavior" or "deviance" refers to behavior which departs sufficiently from the regulatory norms of the larger society to result in or evoke or imply some sort of social control response. Much of what constitutes problem behavior in adolescence, however, is relative to age-graded norms, norms that may proscribe the behavior for those who are younger while permitting or even prescribing it for those who are older. Such behaviors (for example, engaging in sexual intercourse) come to be seen as characterizing the occupancy of a more mature status; hence, engaging in them for the first time can serve to mark for an adolescent a transition in status from "less mature" to "more mature." It is in this regard that a social psychology of problem behavior becomes relevant to processes of adolescent growth and development. The theoretical aim of specifying a proneness to engage in problem behavior becomes largely synonymous among adolescents with the aim of specifying a proneness toward transition. By theoretically mapping the concept of "transition proneness" onto the concept of "deviance proneness," we are able to exploit the developmental implications of problem behavior theory in adolescence.

A fairly comprehensive social psychology comprising three major explanatory systems--personality, the perceived social environment, and behavior--has been employed. Within each system, variables are specified which have logical implications for the likelihood of occurrence of problem behavior or of conformity. In the personality system, values and expectations for achievement and independence, personal beliefs such as social criticism, internal-external control, alienation, and self-esteem, and personal controls such as attitudinal tolerance of deviance and religiosity are some of the major variables assessed. In the perceived social environment system, the main variables are social-psychological rather than demographic; they include value compatibility between parents and friends, relative influence of parents versus friends, parental supports and controls, parental attitude toward deviance, and friends' approval of and models for deviance. The behavior system is comprised of various problem behaviors (marihuana use, problem drinking, premarital sexual intercourse, and general deviant behavior such as aggression, lying, and stealing) and various conventional behaviors (church attendance and school achievement). Problem behavior, in this social-psychological framework, is conceptualized as the outcome of the interaction of variables which instigate or conduce toward departure from norms and of variables which control against such transgression; the pattern of variables constitutes, in the terms of the theory, a deviance proneness or a proneness to engage in problem behavior.

Four important questions are addressed in the present research. First, is there a pattern of personality, environmental, and behavioral attributes among drug nonusers which constitutes a proneness or a social-psychological "readiness" to begin use of marihuana? Second, does such a prior pattern signal not only onset but also variation in time of onset? Third, is variation in time of onset of marihuana use systematically related to variation in the developmental trajectories of the associated personality, social, and behavioral attributes? Fourth, is length of time since onset related to prevalence of other problem or transition-marking behaviors?

METHOD

Participants

In the spring of 1969, a random sample of 1,126 students stratified by sex and grade level was designated in grades 7, 8, and 9 of three junior high schools in a small city in the Rocky Mountain region. Students were contacted by letter and asked to participate over the next four years in a study of personality, social, and behavioral development. Parents were also contacted and asked for their signed permissions. Permissions were received for 668 students and, of these, 589 (52% of the random sample) were tested in April, 1969, and became the Year I cohort of the study. By the end of the Year IV (1972) testing, 483 students were still in the study, representing 82% retention of the initial cohort. Of these, there were 432 students (188 boys and 244 girls) for whom there was no missing year of data, and this latter group constitutes our core sample for longitudinal or developmental analyses. Demographically, the core sample is relatively homogeneous--almost entirely Anglo-American in ethnic background and middle class in socioeconomic status.

Procedure

Data were collected annually in April or May of each year, 1969 to 1972, by means of an elaborate, theoretically derived questionnaire requiring about an hour and a half to complete. The questionnaire consisted largely of psychometrically developed scales or indices assessing the concepts in the social-psychological framework. Administration of the questionnaire took place outside of class in small group sessions. A guarantee of strict confidentiality was given since participants had to sign their names in order to permit annual follow-up. In general, reaction to the questionnaire was one of strong interest.

Establishment of Marihuana Onset Groups

In order to address the four major questions (stated in the introduction), it was necessary to classify the students as to their experience with marihuana over the study years. Since information about marihuana use was not collected in the initial year, 1969, it is possible to classify students as to their use or nonuse only for the 1970-1972 years. In these years, among a variety of other questions about drug use, students were asked: "Have you ever tried marihuana?" (response categories: Never; Once; More Than Once), and "Did your first experience with drugs take place within the past 12 months?" (response categories: Yes; No). On the basis of their responses to these questions, students were classified as Users (response of More Than Once) or as Nonusers for each of the three yearly intervals, 1969 to 1970, 1970 to 1971, and 1971 to 1972. From these classifications it was possible to establish the marihuana onset groups required for the present analyses. Four groups were established:

1. Nonusers (n = 258: 113 males and 145 females), who were students who reported no use of marihuana over the study years.
2. Initiates 1971 to 1972 (n = 45: 24 males and 21 females), who were students who began use of marihuana in the last year of the study.
3. Initiates 1970 to 1971 (n = 48: 18 males and 30 females), who were students who began use of marihuana a year earlier than the preceding group.
4. Users (n = 69: 26 males and 43 females), who were students already using marihuana before the 1970 testing.

(The total n of 420 is less than the 432 in the core developmental sample since there were 5 students with missing data and 7 students from the User group, 4 males and 3 females, who reported subsequent discontinuation of marihuana use and were therefore dropped from these analyses.)

The groups are ordered in relation to time of onset of marihuana use, the Nonusers showing no onset, the Initiates 1971 to 1972 showing latest onset, and the Initiates 1970 to 1971 showing earliest onset among these three groups, none of which had yet begun use as of 1970. The Users, having already begun marihuana use prior to 1970, constitute an important reference group against which to compare the other three. In terms of our basic interest in deviance or transition proneness, an examination of these four transition groups on the social-psychological measures collected in 1970 should reveal whether there is an ordering on the measures that is consonant with, and therefore predictive of, the order of onset of marihuana use.

Measurement of the Social-Psychological Variables

The measures of the variables in the personality, perceived environment, and behavior systems have been described elsewhere (e.g., Jessor & Jessor, 1975). Details about the item content and the scoring of the 1969 version of the questionnaire appear in Jessor (1969). For the most part, the scales have adequate psychometric properties as shown by Scott's Homogeneity Ratio and Cronbach's alpha index of reliability. Measurement stability over time, as shown by inter-year correlations, is substantial; and various kinds of validity, including construct validity, have been established in the numerous studies cited earlier.

RESULTS

The results are organized around the major questions stated in the introduction. First, both univariate and multivariate data are presented to enable the assessment of the predictability of onset and of time of onset of marihuana use. Second, figures showing the developmental trajectories of several of the social-psychological predictors over the study years are presented to enable assessment of the degree to which marihuana onset is associated with personality, social, and behavioral development. Third, data on the prevalence of other problem or possible transition behaviors enable an assessment of the degree to which they co-vary with the length of time since onset of marihuana use.

Predicting Onset and Time of Onset of Marihuana Use

The first approach to predicting onset from antecedent measures was to examine the mean scores of the groups on the theoretical variables in 1970, when only one of the groups had experience with marihuana while the other three had not. Since the data for boys and girls are very similar, they are presented for the sexes combined. The means and the associated F-ratios for 19 theoretical variables are shown in Table 1.

The data in Table 1 provide substantial support for the relation of marihuana onset to a deviance or transition prone pattern of social-psychological attributes existing prior to onset. Group 1, the Nonusers who report no onset during the study years, has the most conventional or least deviance prone scores on every one of the measures. It has the highest value on achievement, the lowest value on independence, the smallest independence-achievement value disjunction, and the highest expectations for achievement within the motivational instigation structure of the personality system. In terms of beliefs, it is least alienated and least socially critical; and in terms of personality controls, it shows the highest attitudinal intolerance of deviance, strongest religiosity, and highest negative functions of (reasons against) drug use. With regard to the distal structure of the perceived social environment system, Group 1 evidences the greatest parent-friends compatibility, the greatest influence of parents relative to that of friends, and the greatest parental support and controls; in the proximal structure, the Nonusers report the least friends' and parents' approval of drug use and the least friends' models of drug use. Finally, with respect to the behavior system, the Nonusers have the lowest

Table 1
1970 Mean Scores on Transition Prone Attributes For Each Transition Group (Sexes Combined)

	Transition Groups				
Measures	1. Nonusers (n=258)	Initiates 2. 71-72 (n=45)	Initiates 3. 70-71 (n=48)	4. Old Users (n=69)	F^a
Personality System					
Motivation-Instigation Structure					
Value on achievement	72.37	69.13	67.37	55.32	21.23***
Value on independence	71.81	72.12	74.40	75.55	2.07 NS
Independence-achievement value disjunction	89.44	92.99	97.03	110.23	27.31***
Expectations for achievement	57.98	56.05	50.48	45.26	9.71***
Personal Belief Structure					
Alienation	35.76	37.24	37.85	37.83	3.52*
Social criticism	28.64	28.83	30.98	31.30	7.45***
Personal Control Structure					
Attitude toward deviance	184.51	160.30	156.60	135.28	38.22***
Religiosity	13.70	12.29	11.43	10.98	10.13***
Negative functions drugs	34.80	33.52	29.03	23.31	59.43***
Perceived Environment System					
Distal Structure					
Parent-friends compatibility	8.81	7.84	7.96	6.72	15.08***
Parent-friends influence	17.89	19.22	20.64	23.01	22.51***
Parental support	7.66	7.16	7.28	6.39	8.12***
Parental control	7.57	7.33	6.79	6.78	5.98***
Proximal Structure					
Friends' approval drug use	3.32	3.96	4.69	6.14	70.47***
Parental approval drug use	1.09	1.11	1.17	1.41	9.16***
Friends models drug use	3.34	3.36	4.58	6.03	71.52***
Behavior System					
General deviant behavior/past year	34.09	39.51	41.10	44.83	58.33***
Church attendance/past year	36.04	25.11	18.40	18.41	11.31***
Grade point average/past year	3.03	2.95	2.85	2.80	3.10*

---

[a] $^*p < .05$ $^{**}p < .01$ $^{***}p < .001$

deviant behavior score and report the largest frequency of church attendance and the highest grade point average. This remarkably consistent pattern is theoretically the pattern that is most conventional or conforming in nature.

The pattern gains significance from the fact that in almost every case Group 4, the Users, is the group whose mean scores provide the most extreme contrast, the pattern that is, as expected, most deviance prone. Of crucial importance, the mean scores of Groups 2 and 3 are, on most of the variables, ordered exactly in accord with their order of onset of use, Group 2 being closer to Group 1 and Group 3 being closer to Group 4. The overall F-ratios, with few exceptions, are highly significant. These data, then, provide pervasive support of the relationship of theoretically deviance or transition prone attributes to both onset and time of onset of marihuana use during adolescence.

The second approach to predicting time of onset enables an appraisal of the strength of the overall framework. Multiple regression analyses were carried out using the 1970 measures as predictors and time of onset (membership in Groups 1, 2, or 3) as the criterion score. Group 4 was not included so that the criterion score could represent variation in time of onset among students who were all nonusers in 1970. The multiple $\bar{R}$'s for a set of predictors similar to those listed in Table 1 were .61 for males, .44 for females, and .49 for the sexes combined. All of these are significant at $p < .001$, thus providing direct support for the usefulness of the theory in predicting onset of marihuana use.

Another way of examining the relation of the social-psychological variables to variation in onset of marihuana use is to compare the groups on the same measures *at the end of the study*, in 1972. Mean scores in 1972 should reflect variation in length of involvement with marihuana, that is, the outcome of the transition. The data relevant to this issue are presented in Table 2.

The data in Table 2 again are related strongly to the time of onset variation. In a number of instances, the means of the two groups that make the transition, Groups 2 and 3, have moved closer to the mean of Group 4 and further away from Group 1, the group that does not make the transition to use. The multiple $\bar{R}$'s against the onset criterion score are now considerably higher: .69 for males, .72 for females, and .68 for the sexes combined. Thus, the 1972 measures of the social-psychological framework account for nearly 50% of the variance in the onset criterion, almost twice as much as was accounted for by the 1970 antecedent measures.

Onset of Marihuana Use and Social-Psychological Development

The demonstration of a social-psychological readiness to begin use of marihuana that is, in fact, predictive of its onset and the demonstration that time since onset is related to subsequent social-psychological outcome both suggest that *the course of social-psychological development during adolescence should vary depending on whether and on when marihuana use begins*. This issue is addressed in this section by plotting the actual course of development over the study years of the four transition groups on a variety of measures of the theoretical variables. For many of the variables, scores are available in all four years, 1969 to 1972, whereas for others they are available only in the latter three years.

Figure 1 presents the "growth curves," over the 1969 to 1972 years, of attitudes toward deviance (the higher the score the greater the intolerance) for the four transition groups. The graph is revealing. Group 1, the Nonusers, was most intolerant in 1969 and remains most intolerant throughout; while becoming significantly more tolerant over the years, it nevertheless remains less tolerant in *1972* than any of the other groups was in *1969*. Group 4, the Users, was the group most tolerant of deviance in 1969 and it shows no significant change over the study years on this measure. The two groups that make the transition from nonuse to use during the study years are intermediate in tolerance of deviance at the outset, and both become significantly more

Table 2
1972 Mean Scores on Transition Prone Attributes For Each Transition Group (Sexes Combined)

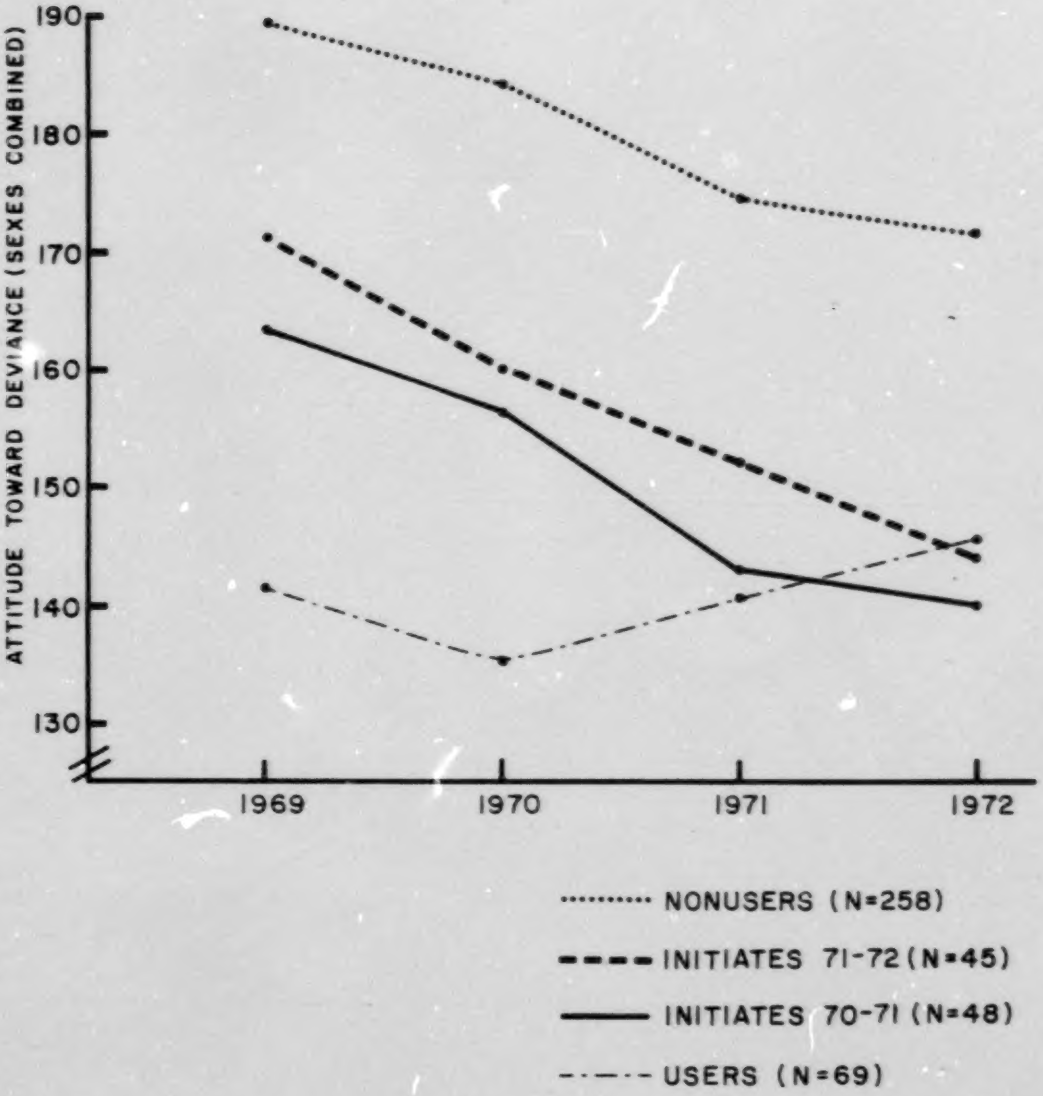
	Transition Groups				
Measures[a]	1. Nonusers (n=258)	Initiates 2. 71-72 (n=45)	Initiates 3. 70-71 (n=48)	4. Old Users (n=69)	F[b]
Personality System					
Motivation-Instigation Structure					
Value on achievement	67.94	58.28	57.52	52.90	14.48***
Value on independence	74.42	76.27	76.90	77.00	1.22 NS
Independence-achievement value disjunction	96.48	107.71	109.37	114.10	17.53***
Expectations for achievement	59.59	50.89	54.38	51.72	5.15***
Personal Belief Structure					
Alienation	35.06	36.47	35.68	36.91	1.92 NS
Social criticism	28.93	30.60	32.02	33.54	17.61***
Personal Control Structure					
Attitude toward deviance	171.72	144.38	140.28	146.11	22.64***
Religiosity	16.46	13.03	11.16	11.62	14.56***
Negative functions drugs	33.17	25.14	23.63	22.62	72.50***
Perceived Environment System					
Distal Structure					
Parent-friends compatibility	8.75	7.24	7.48	7.07	13.02***
Parent-friends influence	3.35	3.69	3.93	3.79	4.98**
Parental support	7.75	6.98	7.02	6.74	7.27***
Parental control	6.20	6.16	5.38	5.34	5.65***
Proximal Structure					
Friends' approval drug use	3.51	5.78	6.46	6.36	102.19***
Parental approval drug use	1.17	1.42	1.67	1.80	20.43***
Friends models drug use	4.54	7.24	7.94	8.12	128.63***
Behavior System					
General deviant behavior/past year	35.79	43.18	45.10	43.15	45.66***
Church attendance/past year	28.20	22.13	8.72	13.50	9.73***
Grade point average/past year	3.15	3.01	2.84	3.00	3.89***

---

[a] Since the score range for some of the measures (e.g., religiosity, parent-friends influence) was changed between 1970 and 1972, developmental comparisons between Table 1 and Table 2 mean scores may be misleading in those cases.

[b] *p $< .05$ **p $< .01$ ***p $< .001$

FIGURE 1



DEVELOPMENT OF ATTITUDE TOWARD DEVIANCE
AND THE ONSET OF MARIJUANA USE

tolerant by the end. What is especially interesting is that the two Initiate groups, originally significantly more intolerant than the Users, converge on the latter group so that by 1972 there is no difference between their means; and the means of all three groups are significantly different from the mean of the Nonusers. Using marihuana, it would appear, has "homogenized" the two previously nonusing groups with the already-using group on this attitudinal measure of personal control. The curves in Figure 1, then, evidence a systematic relation between the development of a personality attribute and the onset of marihuana use in adolescence.

In Figure 2, the curves for value on achievement are presented; and again the same characteristics are apparent. On this measure, the two Initiate groups are close to the Nonuser group in 1969; and all three are significantly higher than the User group. While all groups decline in value on achievement over the study years, the slope is steeper for the Initiate groups than for the Nonusers; and by 1972, there again is evident a convergence with the Users. In 1972 there is no significant difference among the two Initiate groups and the User group, and all three are now significantly lower in value on achievement than the Nonusers.

The curves in Figure 3 represent the development of an attribute of the perceived environment, the perceived prevalence of friends' models for drug use. Here again, over the 1970 to 1972 years in which these data were collected, there is observable the different courses of development associated with variation in time of onset of marihuana use. Again there is convergence of the two Initiate groups with the User group by 1972; what is of further interest is the fact that the steepest slope of increase for each Initiate group occurs in its year of onset of marihuana use.

On another measure of the perceived environment (Figure 4), total friends' approval for a variety of problem behaviors, the four groups are perfectly ordered in 1970 with regard to likelihood of onset; and the two transition groups again converge, by 1972, on the User group. In 1972, the three user groups are all significantly higher in total friends' approval for problem behavior than the Nonusers.

The final figure (Figure 5) represents a measure from the behavior system, general deviance, and the curves are consistent in showing the developmental phenomena previously noted: the initial ordering in regard to likelihood of transition; the marked convergence on the mean of the User group; and, in this case again, the occurrence of the steepest slopes of increase in the year in which onset takes place. In 1972, the Nonusers are significantly lower in deviant behavior than the three other groups, and there is no significant difference among the latter.

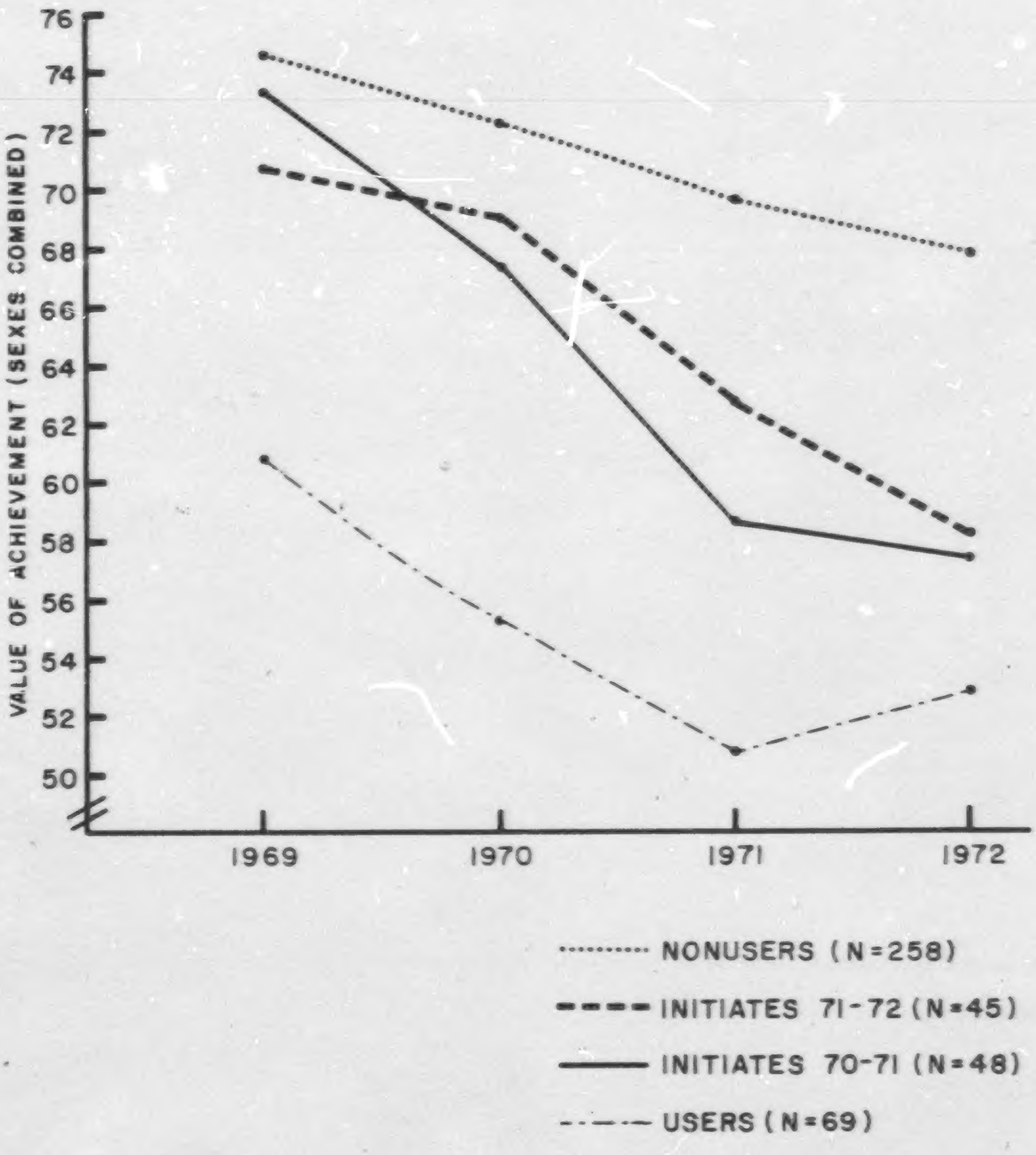
The figures, taken together, make a strong case for a systematic developmental relationship between onset of marihuana use and other social-psychological attributes. These findings are a unique and important outcome of the longitudinal research design.

Onset of Marihuana Use and Prevalence of Other Transition or Problem Behaviors

The relation of time of onset of marihuana use to prevalence of other problem or possible transition behaviors, e.g., experience of sexual intercourse, problem drinking, or participation in activist protest, is shown in Table 3.

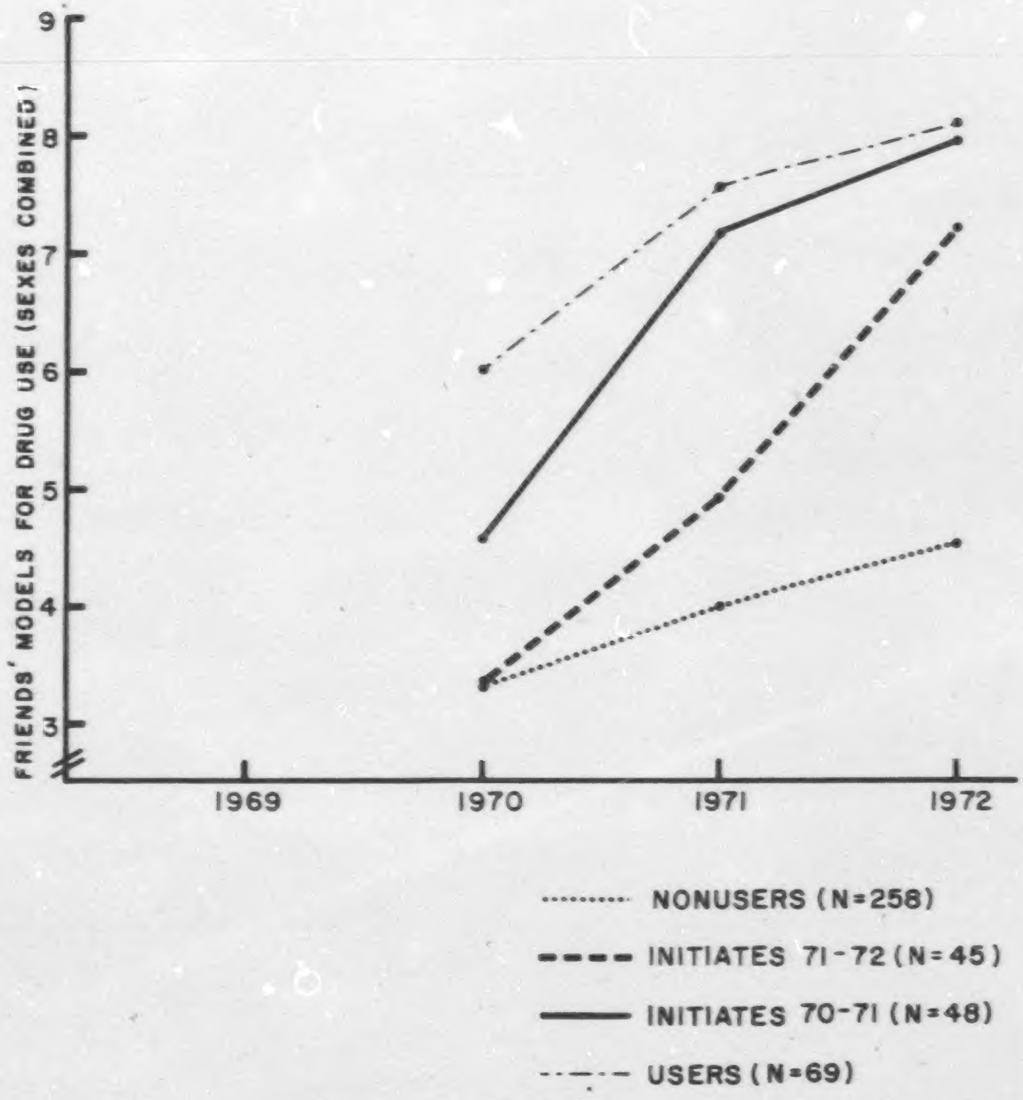
There is a significant relation between the onset of marihuana use and the prevalence of each of the three behaviors shown in Table 3. Both Initiate groups show higher prevalence than the Nonuser group, and the groups are ordered in direct relation to length of time since onset. Rates for the three other behaviors in the early onset group are about three times the rates in the Nonuser group, a difference in magnitude that is of obvious social significance. Thus, the onset of marihuana use cannot be seen as an isolated transition or behavior change but, instead, as related to other problem or transition behaviors, as it should be according to problem behavior theory.

FIGURE 2



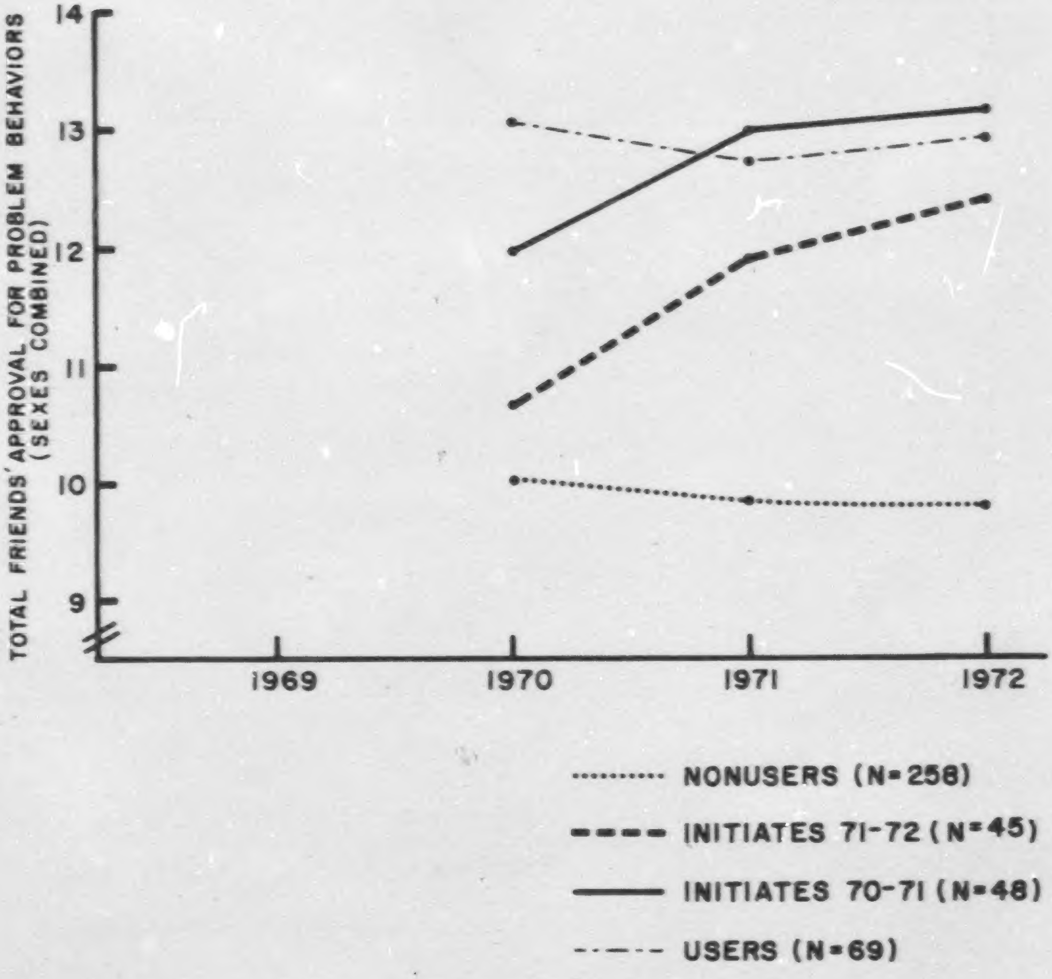
DEVELOPMENT OF VALUE ON ACHIEVEMENT
AND THE ONSET OF MARIJUANA USE

FIGURE 3



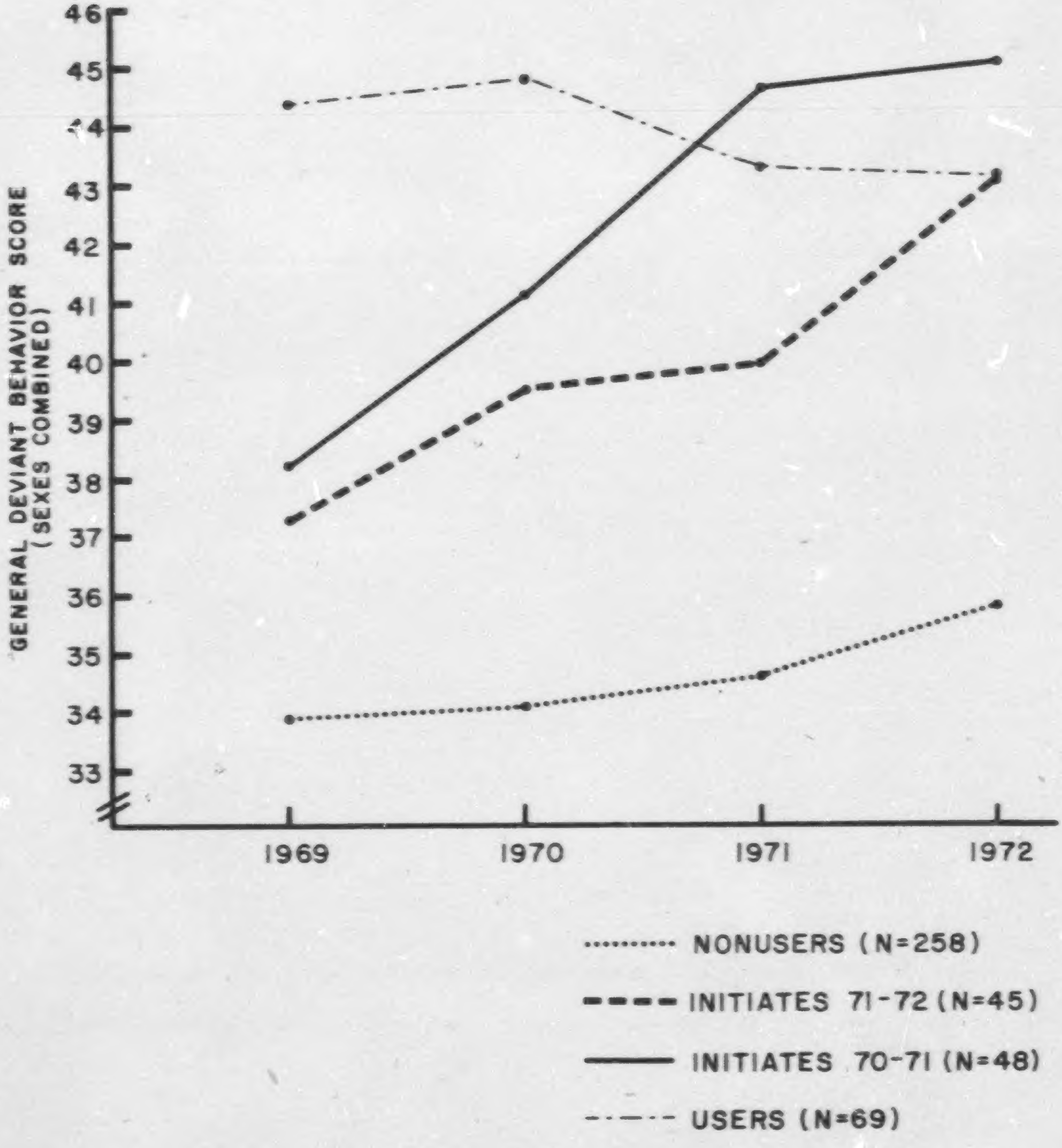
DEVELOPMENT OF FRIENDS' MODELS FOR DRUG USE
AND THE ONSET OF MARIJUANA USE

FIGURE 4



DEVELOPMENT OF TOTAL FRIENDS' APPROVAL FOR PROBLEM BEHAVIORS AND THE ONSET OF MARIJUANA USE

FIGURE 5



DEVELOPMENT OF GENERAL DEVIANT BEHAVIOR
AND THE ONSET OF MARIJUANA USE

Table 3

Marihuana Transition Groups and
Percent Prevalence of Other Problem Behaviors
Year IV (1972) Data, Sexes Combined

Transition Groups	Percent Reporting Each Behavior Sexual Intercourse	Problem Drinking	Activist Protest
1. Nonusers (n=258)	17	19	9
2. Initiates (1971-72) (n=45)	41	58	20
3. Initiates (1970-71) (n=48)	48	67	34
Chi-square	28.1	61.6	22.8
p	<.001	<.001	<.001

SUMMARY

The aim of this report has been to assess the utility of a social psychology of problem behavior for predicting the onset of marihuana use. Onset and time of onset were shown to be systematically related to a social-psychological pattern of attributes defining a deviance or transition proneness. That pattern includes lower value on achievement and greater value on independence, greater social criticism, more tolerance of deviance, and less religiosity in the personality system; less parental control and support, greater friends' influence, and greater friends' models and approval for drug use in the perceived environment system; and more deviant behavior, less church attendance, and lower school achievement in the behavior system. The nonusers of marihuana tend to represent the opposite pattern, a pattern of relative conventionality or conformity.

Of special importance, the longitudinal data enabled the examination of the developmental trajectories of these theoretical attributes in relation to marihuana onset. It was quite clear that the course of adolescent development is significantly related to whether and to when marihuana onset occurs. Beginning to use marihuana leads to a developmental divergence from nonusers and a convergence upon the characteristics of those who are already users.

Finally, it was shown that marihuana onset is related to the prevalence of other problem or transition-marking behaviors such as sexual intercourse experience, problem drinking, or participation in activist protest. The conclusion to be drawn is that deviance or transition proneness is not specific to a given behavior but constitutes a more general developmental notion.

The utility of that notion has been supported by the data presented here and elsewhere (Jessor & Jessor, 1975a; Jessor & Jessor, 1975b). Deviance or transition proneness, as defined in relation to our social-psychological framework, apparently identifies an important disposition toward adolescent change and growth, including the initiation of the use of marihuana.

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NOTES

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DRUG USE RESEARCH ITEMS PERTAINING TO PERSONALITY AND INTERPERSONAL RELATIONS: A WORKING PAPER FOR RESEARCH INVESTIGATIONS

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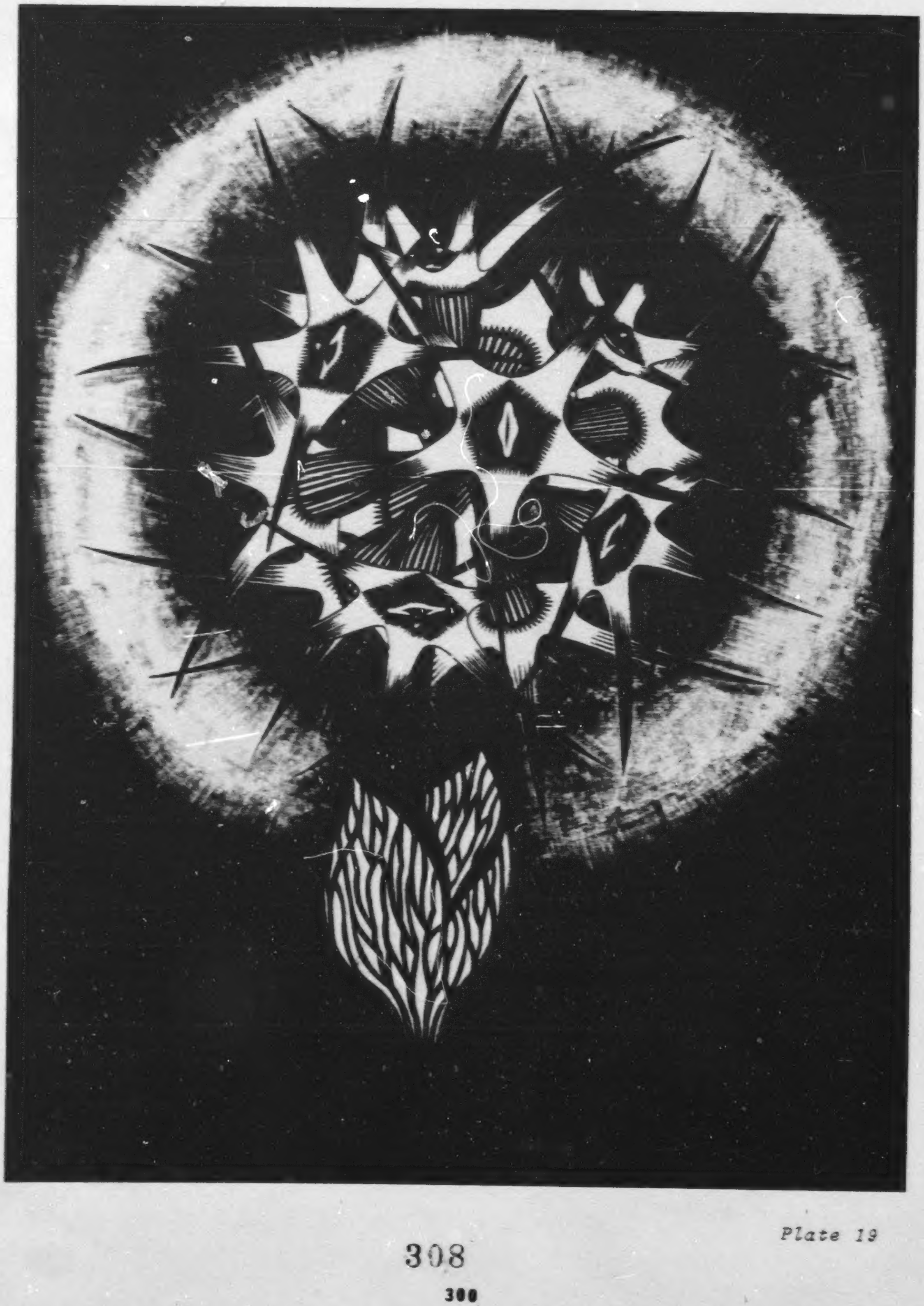

Plate 19

DRUG USE RESEARCH ITEMS PERTAINING TO PERSONALITY AND INTERPERSONAL RELATIONS: A WORKING PAPER FOR RESEARCH INVESTIGATORS

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INTRODUCTION

This paper is intended specifically as a working document for persons actively engaged in research on drug use among college students and other young people. The results and commentary should be regarded as preliminary and suggestive rather than definitive because they are based on bivariate analyses of single items. This analysis is simply one step in the process toward understanding the relation of drug use to personality and interpersonal relationships.

The document consists of two sections. In the first section we (1) describe the longitudinal study on which the data are based, (2) discuss some conceptual and methodological issues pertaining to the use of personality and interpersonal variables in drug research, (3) present a brief summary and discussion of our findings, (4) explain the rationale underlying the organization of variables in the tables, and (5) describe and discuss the drug change typology that is used in the analysis.

The second section is presented as two appendices to the paper and includes the tables and a brief discussion of how the drug change typology is related to each item (about 80 in all) at each of two points in time.

BACKGROUND AND DISCUSSION

Description of the Study

Data reported here (see Appendices) were obtained from a random sample of men who enrolled at the University of California as freshmen in Fall, 1970. (Not included in this paper are data from a companion sample of men who graduated as seniors in Spring, 1971.) Data from the freshman cohort were collected at two points in time. Time-1 (Fall 1970) data were obtained by means of personal interviews and self-administered forms from 960 men. The completion rate, 92% of the originally designated sample, was exceptionally high[1]. The same men were resurveyed at Time-2 (Spring 1973), two and one-half years later. In this second data collection we mailed self-administered questionnaires to all 960 of the Time-1 responders. In spite of difficulties in locating men who had transferred to other schools or dropped out of school altogether, we again achieved a very high completion rate, 87% of the Time-1 responders, or 80% of the originally designated sample. These response rates help greatly to reduce possible sampling biases that might be associated with nonparticipation.

The majority (73%) of the 834 Time-2 responders were still enrolled at the University of California at Time-2, most of them as juniors. Another 13% had transferred to other schools, and 14% had dropped out of school, at least temporarily. The transfers and dropouts are not shown separately in these analyses, and it should be noted that the dropouts are represented somewhat disproportionately in the group identified as polydrug users in the tables.

Questions about drug use were asked in an identical fashion in the first and second questionnaires. These questions were restricted to use of illicit drugs and to illicit use of drugs that can be obtained legally. Respondents were instructed to answer about their use of prescription drugs only if they had obtained the drugs without a prescription or had used them in ways other than prescribed. The drug classes about which we asked were: 1) marihuana and/or hashish; 2) psychedelics (e.g., LSD, peyote); 3) amphetamines and other stimulants; 4) sedatives, hypnotics, and other "downers"; 5) cocaine; 6) heroin; 7) opium; 8) other opiates; and 9) inhalants. For the psychedelics, stimulants, sedatives, other opiates, and inhalants, we supplied a short list of trade and street names of specific drugs to help respondents recall drugs they had used.

Most of the personality and other items shown in this paper were also asked in identical fashion in the Time-1 and Time-2 self-administered questionnaires. In some cases, items were asked in terms of a time reference that varied in the two waves. For example, many of the Time-1 questions about relationships with parents were asked in terms of the period prior to entering college, i.e., "during high school." At Time-2 the same questions were asked in terms of the present time to ensure that all respondents were answering in terms of the same time reference and that the periods referred to in the two questions did not overlap.

Personality and Interpersonal Variables in Drug Research

Personality and interpersonal variables are of obvious importance in studies that seek to understand why people use drugs and to assess the consequences of various patterns of use. As *precursors* of drug use, the test of the usefulness of these variables is how well they predict which persons begin to use drugs, which ones cease using them, and which ones either escalate or reduce their level of use. As *consequences* of drug use, the test is the extent to which drug variables predict changes in how well individuals function psychologically and in their interpersonal relationships. As we will see throughout the paper, personality and interpersonal variables also can tell us a great deal about values and life-styles. There is some reason to believe that in student populations values and life-style may tell us at least as much about drug use as personality variables do.

Studies of drug use among students usually include two broad types of personality hypotheses. One view reflects the widely entertained hypothesis that drug use is associated with psychopathology, i.e., drug users are more neurotic or disturbed than nonusers. The other reflects a seemingly opposing hypothesis to the effect that drug users may tend to have personality traits (e.g., greater creativity, sensitivity and openness to new experience) which, if channeled constructively, could reflect high levels of personal development and future potential.

These two general hypotheses may not be as contradictory as they seem for two reasons. First, it is becoming increasingly clear (as our own data will show) that "drug users" do not comprise a homogeneous group. Thus psychopathology may be associated with certain patterns of drug use but not others; and certain types of drug users may be more open, autonomous, and creative than others. Second, the two hypotheses may appear to be more contradictory than they really are because various forms of psychic distress customarily connote mental illness whereas, in fact, they may signify that an individual is making a concerted and realistic effort to cope with real and important problems. In the long run, this individual may achieve a higher level of personal development than one who allows himself to become psychologically stagnant because he is afraid to experience anxiety, distress, or interpersonal conflict.

Sorting out these issues is one of the major challenges we face in our present research. The analysis presented here is a first step in that direction and will be supplemented with data from a subsample of our respondents who completed the Loevinger Ego Development Sentence Completion Test. We are using the Loevinger scores as a criterion variable in the subsample data to identify personality variables (or, more importantly, combinations of variables) that are related to ego development. We will use results of this analysis in constructing measures of ego development for the sample as a whole.

It is too early to present results of this analysis, but one interesting observation is worth mentioning: on some of our self-administered items, the respondents with high ego development scores are more likely than others to either check "undecided" or not answer the question. On other items they are more inclined to check the qualified categories than the extreme categories. Thus one trait that may distinguish the high scorers from others is a capacity for more complex thinking processes. This possibility is supported by the fact that the Loevinger test is highly correlated with the Kohlberg Moral Dilemmas Test, and it may present a problem for researchers who like to rely on relatively "simpleminded" and economical batteries to obtain personality data. However, it may also provide a clue to identifying respondents at a relatively high level of ego development.

While we are on the topic of methodological issues, there is another that deserves attention. In this study we relied largely on personality items, the meaning of which was reasonably manifest to respondents. The items also refer to subjective states: and their validity depends on the respondents' willingness to report feelings of distress and equally important, on the extent to which they are aware of their own feelings. One might argue, therefore, that the lack of difference between drug users and nonusers on an item such as satisfaction with one's life may be due to lack of self-awareness or to motivated distortion on the part of drug users, i.e., a desire to make it appear to a skeptical outside world that they are doing better than they really are. Use of items such as these in large-scale surveys is often criticized on these grounds, and this issue is one that deserves explicit attention.

Several comments can be made on this point. Our position is that items such as these are both meaningful and useful, provided that the investigator bears in mind that they yield subjective self-reports which as single items must be carefully analyzed and interpreted. Such items are manifestly useful because they represent ways in which respondents describe their views of themselves and their world. Moreover, we doubt very much that there was any substantial amount of motivated distortion in these self-descriptions on the part of drug users.

Our confidence in these data is based on several considerations. First, the study setting is one in which drug use is normative rather than deviant, and there is no reason to believe that drug users are defensive or reluctant about discussing their use of drugs. Second, the study was designed and presented to respondents as a study of changing life-styles and values among university men, not as a drug study _per se_; and questions about drug use were embedded in a long questionnaire dealing with a wide variety of issues and topics of interest to students. Thus, there was no reason why a respondent's self-identification as a drug user should have been especially salient to him in responding to our questions. Third, we used an elaborate procedure for ensuring the anonymity of our respondents. From comments made to interviewers, respondents seemed to be impressed that we would go to so much trouble in this respect and were convinced that they could safely answer our questions without jeopardizing themselves. Fourth, the data themselves demonstrate that on many items drug users did describe themselves in less favorable terms than did the nonusers. Usually these differences were entirely consistent with what is known about the social-psychological implications of drug use. Even more convincing is the fact that in some cases the various groups of drug users differed as much among themselves as they did from the nonusers.

There are some items, of course, which do not differentiate drug users from nonusers. Here we would caution against discarding such items indiscriminately simply because they do not appear to "work." We will show later, for example, that drug users are no more likely than nonusers to express dissatisfaction with the way their lives are going, even though there are many other items on which users are more likely to report high levels of particular kinds of psychic distress. This finding may be very important in terms of ego development because it suggests that drug users may be better able to tolerate certain kinds of internal stress than nonusers are.

The possibility that some respondents may not be very sensitive to or aware of their own feelings may be a more serious problem than motivated distortion in analyzing data based on subjective self-reports. Various kinds of personality tests are designed specifically to overcome this problem, and there is no question that such tests may be required when the main objective is to zero in on a limited set of specific hypotheses. For the most part we do not believe that the field of drug research has arrived yet at this stage. When we designed this study we viewed drug research as being at an intermediate stage, somewhere between the exploratory one-time survey and the more definitive, rigorous hypothesis-testing/long-term longitudinal study. In this investigation we took what seemed to be the most promising leads from the early exploratory studies and we set out to discover which ones appeared to hold up under a more rigorous longitudinal test.

We found ourselves with a great many promising leads to pursue; and the use of time-consuming personality scales, sentence-completion tests, or projective tests to measure the multiplicity of variables involved was simply out of the question. In this situation, we adopted a procedure that is commonly used in large-scale surveys, i.e., we utilized a limited number of subjective self-report items to represent personality dimensions of interest. Wherever possible these items were taken from existing, standardized scales, although it is a generally recognized axiom that taking a few such items out of context may alter their meaning and invariably results in a loss of scale reliability. The question remains, therefore, can the use of such items be justified. Of course, the answer is yes if they are carefully analyzed and provide meaningful answers. Our experience has shown that using a combination of factor analysis and good judgment, such items can be combined to construct useful indices; and even though the reliability of the indices does not meet customary standards, their manifest content is usually so clear that there is little doubt about the dimension being measured.

Summary and Discussion of Findings

The bulk of this paper is presented in the attached appendices which include the tables and a detailed item-by-item annotation. The appendices are intended to show how each of a large pool of items is related to drug use; therefore, it will require close examination by those readers who are specifically interested in selecting items for future studies or in seeing how our results compare with theirs in cases where we have used the same or similar items. However, we think it would be useful at this point to provide a brief resume of our major findings and some speculations about their meaning and implications.

a. PERSONALITY VARIABLES: With respect to the first set of data dealing with ego integration and other personality variables, our first observation is that drug use appears to be more highly related to variables we have conceptualized in terms of "ego integration" than it is to the "general neuroticism" variables. The latter items were obtained from an instrument that has been widely used in studies of psychiatric outpatients to screen for patients with classic forms of neurosis, i.e., anxiety and depression (See, for example, Lipman, Covi, Rickels, Uhlenhuth, & Lazar, 1968). The former come from two areas of interest: (a) identity crisis and (b) the amotivational syndrome. It is especially interesting that the items from the neuroticism factor that do relate fairly well to drug use are "feeling hopeless about the future," which clearly connotes identity crisis, and "bothered by being absentminded," which has equally clear implications regarding the amotivational syndrome.

In the general area of emotional distress, therefore, it would appear to be more fruitful to utilize items pertaining either to the concerns about self-understanding and value conflicts or to the amotivational syndrome and less fruitful to rely on conventional measures of psychopathology.

Among the amotivational syndrome items, the one that is most highly related to drug use (especially to polydrug use) is the adjective checklist item "restless, discontented." Another, though less highly related, is "bored." Both items imply difficulty in finding stimulating and challenging ways to use one's energies and may reflect deficiencies in the academic or social environment as much as psychic impairment in the individual. This possibility dictates caution in analyzing data that are presumed to reflect the amotivational syndrome, especially since restlessness and boredom may also occur in the process of resolving identity conflicts.

Caution in this respect is also dictated by the fact that lack of concern about goals is generally regarded as a symptom of the amotivational syndrome, and our data provide little evidence that drug users differ noticeably from men who never use drugs. We do find that the polydrug users give less thought to their career goals than other men do, but this may be due largely to a subcultural rejection of the work-success ethic. Along the same lines, we have reported elsewhere that drug users tended to be less clear than nonusers about their career goals as freshmen, but they had largely caught up two and one-half years later (Somers, Mellinger, & Manheimer, 1974). Similarly, we find that men who use drugs are less inclined to describe themselves as being studious and concerned about grades than are men who do not use drugs. Nevertheless, as we have also reported elsewhere, the drug users appear to be doing at least as well as the never users in terms of grades (Mellinger, Somers, Manheimer, & Skronski, 1974).

These observations support the comment we made earlier that subcultural values may be another key to understanding drug use in college populations. Acceptance of certain countercultural values may create problems for the individual, of course, after he leaves college. The persistence of these values, their implications for the individual's well-being, and the role of drug use in these matters will be major topics in our analysis of data from the senior panel.

b. INTERPERSONAL RELATIONS: One set of findings in this area that strikes us as especially interesting has to do with relationships with women. On the one hand, the men who never used drugs are more likely to report that they never date than the drug users are, and they are more likely to express self-doubts about their relationships with women. The data also shows a strong relation, in the expected direction, between drug use and living with a girlfriend. Thus drug users, as a group, appear to have more self-confidence and more actual interaction with women than do the never users; and yet they are just as likely as the never users to express dissatisfaction with their relationships with women.

This finding is open to several interpretations, some of which need not be pursued here. One possibility, however, does deserve comment. One finding in the data raises a question about the quality of these relationships and about the capacity of drug users, as compared with never users, for close interpersonal relationships with women. This interpretation is supported by the fact that drug users are much more likely than never users to subscribe to the statement, "When I'm with girls, I sometimes try to see how much I can get in terms of sex." This statement has a strong overtone of exploitativeness which countercultural values pertaining to sexuality may tend to rationalize and encourage. However, like the traditional double standard which also encourages wider sexual experience, this kind of exploitativeness probably creates a barrier to intimacy at a deeper level.

We view this as an exceedingly important issue, and it is one that we intend to pursue.

How the Data Were Compiled and Organized

The data reported here represent a large pool of items. As a basis for organizing the items for presentation, we used results from two factor analyses: one analysis included the items pertaining to ego integration (Table 1, Appendix A); the other included those pertaining to interpersonal relationships (Table 2, Appendix B). A few items were included in both factor analyses because we were interested in knowing how certain key items in one area related to items in the other.

We have applied the following labels to the personality factors:

I. General Neuroticism
II. Ego Integreation I: Psychological Well-Being
III. Ego Integration II: Amotivational Syndrome
IV. Athletic/Energetic/Competitive
V. Tolerance vs. Inflexibility/Hostility
VI. Creativity/Autonomy
VII. Outgoing/Expressive vs. Isolated/Withdrawn
VIII. "Live for Now"/Alienation
IX. Introspectiveness/Goal Orientation
X. Identifications With Significant Reference Groups
XI. Miscellaneous

Factors in the set of interpersonal items were labeled:

I. Satisfaction With Relationships With Women
II. Expressiveness
III. Anxiety About Interpersonal Relationships
IV. Hostility
V. Relationships With Father
VI. Friends

Of course, these headings are arbitrary, and they do not necessarily correspond to indices that we will use in later analysis. For this paper they simply provide a convenient way of grouping items in the two sets of tables in the appendices.

The Drug-Change Typology

Our main task in this report is to show how items in each of the two areas are related to drug use. In choosing among several available indices of drug use, we had an option with respect to level of complexity because from our longitudinal data we have relatively simple indices at each point in time; and we also have a typology of change in drug use, which is more complex but also more informative.

We chose the more complex typology here for several reasons. First, the change typology demonstrates very clearly that "drug users" often are quite heterogeneous in terms of personality and other characteristics, and this heterogeneity is most apparent when you know what their drug-using status was at both points in time. These differences often provide important clues about precursors and consequences of drug use that would not be evident in drug indices based only on one point in time. Second, even though the change typology cannot, by itself, tell us all we would like to know about the relation of changes in drug use to changes in other variables, it provides a more rigorous test of how well the personality and interpersonal variables are working than the simpler measures of drug use.

The drug change typology that is used in the tables is based on an index of drug use at Time-1 combined with the same index at Time-2. The Time-1 and Time-2 indices categorize respondents in the following way:

Never Users (Never)--men who have never used any illicit drug.

Noncurrent Users (NC)--those who have used drugs but not during the past six months.

Current Marihuana-Only Users (MO)--those who have used marihuana but no other drug during the past six months.

Current Polydrug Users (PD)--those who have used other drugs (almost always in addition to marihuana) during the past six months.

We believe it is important to distinguish between the marihuana-only users and the polydrug users because the two groups appear to differ in many respects. In particular, polydrug use clearly signifies a higher level of involvement in drug use (as measured, for example, by frequency of use of marihuana) and in the drug subculture (as measured by number of friends who use drugs and by the inclination to identify other drug users as a significant reference group). The classification thus makes it possible to distinguish any effects associated with use of marihuana per se. Of course, differences between the marihuana-only users and the polydrug users may be due to the greater frequency of marihuana use among the latter group, their use of other drugs, and/or their greater involvement in the drug subculture.

The drug change typology is based on a cross tabulation of the Time-1 and Time-2 indices to produce the following 10 groups:

Typology Group	Drug Index Time-1	 Time-2	(N)
1	Never	Never	(187)
2	Never or Noncurrent User	NC	(61) *
3		MO	(106) *
4		PD	(17) *
5	Marihuana-only User	NC	(58)
6		MO	(169)
7		PD	(80)
8	Polydrug User	NC	(19)
9		MO	(48)
10		PD	(89)

* About 90% of the men in groups 3 and 4 were never users at Time-1. In group 2, 36 of the 61 men were never users at Time-1.

Although the typology is complex, one can learn quickly to discern meaningful patterns in the data. A few illustrations from the tables may hasten the process. In the tables, the drug change variable is presented horizontally. For example, the percentage of those describing themselves as "restless, discontented" in groups 5, 6, and 7 will be shown as follows:

		Marihuana Only (MO)		
Personality Variable:		NC (58)	MO (169)	PD (80)
		%	%	%
Restless, discontented (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	50	42	58
	Time-2	41	50	58

These data show that even though all three groups of men were alike in using marihuana at Time-1, their responses to this item differ in important respects both at Time-1 and at Time-2. For example, the men whose pattern of use remained stable were less likely than the other two groups to describe themselves as restless and discontented at Time-1. Thus for marihuana-only users, this personality variable may be predictive of stability or change in pattern of drug use. Further, at Time-2 there is a fairly sharp linear relation between restlessness and drug use: the marihuana-only users who later become nonusers are least likely to describe themselves as restless; those who become polydrug users are most likely to do so. The findings are obviously very suggestive with respect to the role of restlessness, both as a precursor and as a consequence of change in drug use.

One more example will help to illustrate two other points.

		Never Users	Noncurrent (NC) or Never		
			NC	MO	PD
Personality Variable:		(187)	(61)	(106)	(17)
		%	%	%	%
Feeling unhappy, sad, or depressed (A GREAT DEAL)	Time-1	8	10	8	6
	Time-2	13	10	21	12

The interesting comparison here is between the never users and the 106 marihuana-only users, most of whom had never used drugs at Time-1. Although these two groups did not differ with respect to feelings of depression at Time-1, the men who became marihuana-only users were more likely to report such feelings at Time-2. Again the pattern of change is suggestive, although further analysis would obviously be required to substantiate the possible role of restlessness as a precursor to the observed change in drug use.

The other point to be made is that comparisons between the never users and the 61 continuing nonusers are always ambiguous in these data because the latter group includes 25 men who had already used drugs at Time-1. The drug change typology will be refined in this respect for analyses in which our goal is to identify personality and other traits that are related to starting to use drugs.

The item annotations in the Appendix attempt to identify these and other patterns that recur throughout the tables. The continuing marihuana-only users and the continuing polydrug users deserve special attention because they often stand out among the various groups of drug users, and equally often they differ from each other.

In the tables, the next to the last column shows the responses at Time-1 of men who did not respond to the second wave of data collection. We have not commented on these data in the annotations, but there are some interesting examples of ways in which non-responders differ from men who participated in both waves of the study.

SUMMARY

Data for this paper come from a longitudinal study of a probability sample of men who entered the University of California (Berkeley) as freshmen in Fall 1970. A total of 834 men participated in both waves of the study· Fall 1970 and Spring 1973.

The study is interested in personality and interpersonal variables as possible consequences and concomitants, as well as precursors, of drug use. Responses to some of these variables at Time-1 also are predictive of which drug users reduce or escalate their levels of use by Time-2.

The data tend to support two seemingly contradictory hypotheses, i.e., that illicit drug use is associated with (1) emotional distress and also with (2) traits (such as creativity and openness to new experience) that may indicate high levels of ego development. The paper discusses why these hypotheses may not be as contradictory as they seem. Among the items reflecting emotional distress, those suggesting classic forms of neurosis (anxiety and depression) are less highly related to drug use than are items suggesting lack of ego integration, identity crisis, or the amotivational syndrome. The possibility is raised that responses suggesting lack of motivation may, in part, reflect acceptance of subcultural values associated with the "hang-loose" ethic.

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APPENDIX A

Relation of the Drug Change Index to Personality Items

I. General Neuroticism

Only two of the four items appear to be related in any clear way to the drug change typology: feeling hopeless about the future and being absentminded. Men who were polydrug users at Time-1 were most likely to report feeling hopeless about the future, and the continuing never users were least likely to report this feeling. However, by Time-2 the various groups of users did not differ appreciably from the never users in this respect, the one exception being the Time-1 marihuana-only users who escalated to polydrug use by Time-2.

For the most part, the drug user groups did not differ much from the continuing never users at Time-1 with respect to absentmindedness, although the men who continued to be polydrug users and the marihuana-only users who became noncurrent users by Time-2 were somewhat more likely than others to report being bothered some or a great deal by absentmindedness at Time-1. A much sharper picture emerges by Time-2: the highest percentages of those reporting that they are bothered by absentmindedness occur in the three groups of Time-2 polydrug users. These findings are especially interesting inasmuch as this is one of the complaints commonly associated with the concept of the amotivational syndrome. We cannot explain, however, why it is that polydrug use is associated with absentmindedness at Time-2 but not at Time-1. Length of time of use does not appear to be the answer because the 89 continuing polydrug users are no more likely to report this problem than are the 80 Time-2 polydrug users who were using only marihuana at Time-1, or the 17 Time-2 polydrug users who were not using drugs currently at Time-1. All but two of these 17 men had never used any drugs at Time-1. The association of polydrug use with absentmindedness is also obscured somewhat by the fact that it is reported almost as often by the 61 men who were noncurrent users at both times.

II. Ego Integration I: Psychological Well-Being

Some of the strongest relations between personality and drug use are found in this set of items, especially those dealing with self-understanding and value conflicts and with two additional items (restless, discontented; and bored) that again suggest the amotivational syndrome. Yet, other items in this factor that one might also expect to be related in parallel fashion to drug use turn out to be essentially unrelated.

Both at Time-1 and Time-2 all of the groups of drug users are more likely than the never users to report concern about not having a better understanding of themselves. With a few exceptions the various groups of drug users do not differ greatly among themselves in this respect, although it is interesting that the Time-1 marihuana-only users who were most likely to be concerned about self-understanding at Time-1 were those who either escalated to polydrug use or became noncurrent users by Time-2. The Time-1 marihuana-only users who subsequently became nonusers showed the greatest decrease in this concern, whereas the Time-1 polydrug users continued at a high level of concern, regardless of their subsequent drug use.

Lack of self-understanding was most likely to have been experienced as a serious personal crisis by men who were polydrug users at Time-1, and was least often reported by the never users. By Time-2 this kind of crisis was reported least frequently by men who were no longer using drugs and who were also either marihuana-only users or never or noncurrent users at Time-1 as well as by the never users.

Drug use is also related to the next item (feeling torn between conflicting values and desires) which, like the previous two, have to do with self-awareness and working through a sense of identity. It is worth noting that there is a substantial increase from Time-1 to Time-2 in the percentage of never users reporting this feeling, an increase that is found in most of the drug user groups as well.

Together, these three items reflect a concern with the process of developing identity that might be explained either in terms of personality differences or in terms of subcultural identifications. Thus it may be that men who are attracted to drugs tend to be more introspective than men who are not. It is probably also true that the drug subculture places high value on self-awareness and the need to develop a meaningful sense of identity and that these values are inculcated in the social process of becoming a drug user.

The kind of analysis presented here makes it possible to begin to test alternative (or supplementary) explanations such as these. For example, consider the two groups of men who were noncurrent or never users at Time-1 and who subsequently became either marihuana-only users (n=106) or polydrug users (n=17) by Time-2. Although 90% of these 123 men had, in fact, never used drugs at Time-1, they were twice as likely to have experienced a serious personal self-understanding crisis as of Time-1 than were the never users. This finding lends some support to the first explanation, i.e., that men who are introspective are more likely to be attracted to drug use than men who are not. These data also provide some support for the acculturation hypothesis. By Time-2 both groups have become drug users and the percentages of those reporting a self-understanding crisis has doubled. This interpretation has to be qualified, however, because a similar increase is found among the corresponding groups of men who were marihuana-only users at Time-1 and were therefore already to some extent members of the drug subculture. Sorting out these effects will obviously require additional data and multivariate analysis techniques.

Two other items in the ego integration factor are strongly related to drug use: the self-description adjectives "restless/discontented" and "bored." For both items, the percentages of those saying it "describes me moderately or very well" is highest among the Time-1 current users (with one exception) and lowest among the never users at Time-1. The principle exception is among the Time-1 marihuana-only users. Those who continue to use marihuana-only are less likely to describe themselves as restless or discontented at Time-1 than those who subsequently change their pattern of use either up or down. The same finding occurs in connection with the adjective "bored," and we also saw it earlier in discussing the symptom checklist item, "feeling hopeless about the future." These findings suggest that among marihuana-only users subsequent decisions to abandon use of that drug or to go on to experiment with other drugs are contingent upon the extent to which one is able to avoid feelings of restlessness, boredom and hopelessness. Success in avoiding feelings such as these appears to increase the likelihood of a stable pattern in which one confines use to marihuana. However, it should also be noted that the same kind of pattern does not occur among the Time-1 polydrug users. Thus, we will have to look elsewhere for factors underlying stability or change in use of multiple drugs.

The evidence presented thus far shows that drug use is implicated in various ways, in various indicators of difficulty in achieving ego integration. From these findings we might well expect that drug users would also be more inclined to report general feelings of dissatisfaction with their lives and perhaps lack of self-confidence. Two of the last three items in this factor indicate that such is not the case. The item, "When you think of the things that are important to you in life, how well satisfied are you with the way things are going for you? should be a good indicator of general psychological well-being. By and large, the drug users do not differ from the never users on this item at Time-1; and by Time-2 seven of the nine current or former user groups are less likely than the never users to express dissatisfaction with the way their lives are going. Nor does lack of self-confidence (the last item) consistently differentiate drug users from never users.

On both items we observe the pattern discussed earlier in which the men who are marihuana-only users at both times report less distress at Time-1 than those who were using at Time-1 and subsequently either stopped or went on to polydrug use. Note that the continuing marihuana-only users also differ in the same way at Time-2 from men who either became marihuana-only users after Time-1 or who switched from polydrug use to use of only marihuana. With respect to these ego integration items, it would appear that men who by their freshman year have established a pattern of using only marihuana and who still maintain that pattern two and one-half years later show less evidence of distress than men whose pattern of use is less consistent.

III. Ego Integration II: Amotivational Syndrome

Five of the seven items in this factor discriminate reasonably well between drug users, in general, and the never users. Again we find some striking differences among the various groups of drug users.

In response to the adjective checklist item "lazy," for example, about half of the men who were polydrug users at Time-1 were likely to describe themselves as lazy in the first questionnaire, as were the two smaller groups of marihuana-only users. If anything, however, the 169 men who were using only marihuana at both times were less likely than never users to describe themselves in these terms. Once again, these "stable" marihuana-only users are strikingly different from most of the other groups of current and former drug users, both at Time-1 and Time-2.

Men who were current drug users at Time-1 also are somewhat more likely than others to describe themselves as procrastinating, and at Time-2 the differences among the current user groups were not great. By Time-2, however, this adjective is most likely to be characteristic of men who have remained or become polydrug users; by men who changed from polydrug use to marihuana-only use; and, somewhat surprisingly, by men who were noncurrent users at Time-1, even if they continued to be noncurrent users at Time-2.

With one exception, men who were current users at Time-1 were less likely than others to say at Time-1 that they wished they could settle down and take things more seriously. The one exception is worth noting because it involves the men who were using marihuana-only at Time-1 and who were not using drugs at Time-2. By Time-2, the drug users do not differ much from the never users in this respect. except for the Time-2 marihuana-only users who were previously either noncurrent users or polydrug users.

The next item, "I often act on the spur of the moment...," was intended as a measure of impulsivity and is especially interesting in relation to the Time-1 polydrug users. At both Time-1 and Time-2 there is a sharp, linear and positive relation between subsequent (Time-2) use and impulsivity. Men who continue to be polydrug users are more likely than any of the other groups of users and nonusers to describe themselves as impulsive, while those who were polydrug users at Time-1 but nonusers at Time-2 were least likely to so describe themselves. Impulsivity may thus provide a useful clue in beginning to understand the dynamics of change in polydrug use. The same item also shows the by-now-familiar pattern differentiating the continuing marihuana-only users from those who change.

The adjective "responsibile" appears to have ambiguous meaning in this population. Our factor analysis results show that for some respondents the word implies "dependability" in the conventional sense. For others, it seems to have the connotation of interpersonal responsibility. It is not surprising therefore that it does not discriminate well in this analysis, except for the continuing polydrug users who are least likely at both times to describe themselves as responsible.

"Foresightful, plan ahead" tends to differentiate the Time-1 current users from others in that the former are somewhat more likely to deny the quality at Time-1. At Time-2, the pattern is not as consistent and, except for the continuing polydrug users and those polydrug users who become nonusers, the differences are not very large.

The most highly discriminating variable in this factor is the adjective "studious." In general, and at both times, denial of studiousness is more common among drug users than never users, especially among the polydrug users. This may well be another item that reflects an important value of the drug subculture: it is not "cool" to be regarded as an academic grind. Despite this fact, we have shown in another paper that drug use bears virtually no relation to actual academic performance (Mellinger, Somers, Manheimer, & Skronski, submitted, 1975). Thus drug users appear to call upon other more acceptable sources of, and rationales for, academic motivation.

IV. Athletic/Energetic/Competitive

The first two items in this rather conglomerate factor show relatively little discriminatory power. Two of the three groups of Time-1 polydrug users are less likely than others to describe themselves as athletic, but by Time-2 only the small group of 19 polydrug users who subsequently became nonusers differ in this respect. Similarly, responses to the adjectives "energetic/active" do not show much differentiation. It may be worth noting on both items the sharp drop from Time-1 to Time-2 among the 17 men who were nonusers at Time-1 but polydrug users at Time-2.

The adjective "competitive" probably has some countercultural value connotation; and we find accordingly that the current drug users are less likely than others to accept this self-descriptive term at Time-1. At Time-2 the current and former users are less likely than the never users to describe themselves as competitive. Among men who have used drugs, it is those who are current marihuana-only users at Time-2 who are most likely to describe themselves as competitive. (It should be noted, however, that even among the current users one-half or more are willing to describe themselves as competitive.) Among the Time-1 marihuana-only users, those who are least likely to describe themselves as competitive at Time-1 are those who go on to polydrug use at Time-2. They are very similar in this respect to the continuing polydrug users and to the Time-1 polydrug users who become nonusers by Time-2.

We also find sharp differences on the next item. The never users are more likely than any of the other groups to express doubts about their attractiveness to girls. Among the marihuana-only users at Time-1, those who later became nonusers are more likely than others to express doubts on this score.

Because of the possible risks involved in drug use, it has often been suggested that willingness to take risks is an important trait in differentiating drug users from nonusers. Responses to the adjective checklist item "daring" support this expectation. In this connection it is interesting that the Time-1 marihuana-only users who subsequently become nonusers are less likely to describe themselves as daring at Time-1 than are any of the other groups of Time-1 current users. There is one bit of evidence here that casts doubt on the presumption that willingness to take risks is a predisposing factor in drug use: the 106 men who were nonusers at Time-1 and subsequently became marihuana-only users were no more likely to describe themselves as daring at Time-1 than were the continuing never users. Subsequently, however, they were much more likely to do so.

The next item reflects our interest in the possibility that there may be some conflict within the counterculture between the value placed on intimacy, closeness, and interpersonal responsibility, on the one hand, and a tendency to justify various forms of exploitativeness in the interest of self-expression and doing one's own thing. One form of exploitativeness is represented by the item, "When I am with girls I sometimes try to see how much I can get in terms of sex." It is obvious that the never users are much more inclined to deny that they are exploitative in this respect than are the various groups of drug users. The data are especially interesting in that they suggest both that sexual exploitativeness may be a predisposing factor in drug use and also that acculturation processes may be at work. Evidence for the predisposing hypothesis comes again from the comparison of the never users with the men who were nonusers at Time-1 but marihuana only users at Time-2: the latter were significantly less likely than the former to deny that they try to see how much they can get in terms of sex. Recall that most of the latter group, like the never users, had never used drugs at Time-1. The nonusers who become marihuana-only users also show some evidence of acculturation because they are even less likely to deny sexual exploitativeness at Time-2 than they were at Time-1. In this respect, as "late starters" it seems they have not caught up with the general trend evident among men who were current users at Time-1, that is, a trend from Time-1 toward increasing reluctance to admit exploitativeness. It should be noted that this trend is most pronounced among both groups of Time-1 current users who were nonusers by Time-2. Both groups show substantial increases in the percentage of those denying exploitativeness. Among other things these increases may reflect some rejection of countercultural values.

Ambition, like competitiveness, may be regarded as a personality item with value connotations. In this case, the tendency to deny ambition as a trait is associated mainly with polydrug use. Among the Time-1 current users of marihuana-only, it is only those who go on to become polydrug users who differ appreciably from the never users. At Time-2 those most likely to deny ambition as a trait are the men who were polydrug users at Time-1, regardless of their subsequent drug use.

The final item in this factor pertains to acceptance of one's father's life as a model for one's own. Acceptance of father's life as a model is least evident among the Time-1 polydrug users, regardless of their subsequent choice of drug behavior. We will return to this item later in discussing Table 4.

V. Tolerance vs. Inflexibility/Hostility

The first time, "tolerant, accepting of others," does not differentiate the various groups very much, except that the continuing polydrug users were more likely to view themselves as tolerant at Time-1 than were those who had switched to marihuana-only or who had become nonusers at Time-2. Unlike any of the other groups, the men who were nonusers at Time-1 but users at Time 2 showed a noticeable increase in the percentage describing themselves as tolerant.

"Value tranquility, harmony, inner peace" does not work as well as we expected, perhaps because drug use has diffused so widely through this kind of student population that some of the core values of the earlier deviant drug subculture are no longer widely shared exclusively by drug users. In any case, this value does tend to be associated with polydrug use. At Time-1 it is more often subscribed to by the current polydrug users and, to a lesser extent, by men who subsequently became polydrug users. However, it is somewhat puzzling that by Time-2 the continuing polydrug users are no more likely than the never users to accept tranquility as an important value.

The adjective "uncompromising" also does not show any sharp differences. The Time-1 polydrug users who continue to use drugs are more likely than others to describe themselves as uncompromising, perhaps because they view themselves as an avant-garde minority even among drug users. By Time-2, however, they are less likely to so describe themselves and do not differ greatly from the never users.

On the next item we find a very consistent (though not very large) difference between the never users and all of the other groups. The never users are less likely than others to describe themselves as argumentative. By Time-2 these differences have largely disappeared and we fail to see any meaningful pattern in those that remain.

We find a more meaningful pattern on the next item, "I am willing to disregard the feelings of others in order to accomplish something that is important to me." We interpret this item to reflect a sense of personal autonomy and nonconformity that is strongly entrenched in countercultural values. This interpretation is supported by the fact that the main differences here involve the Time-1 polydrug users who continue to use drugs, and the two groups of men who become polydrug users by Time-2. In general, these men are less likely than others to deny that this statement describes them, i.e., they are more likely to be willing to accept the statement as a self-description.

The next two items deal specifically with hostility. We have presented results of the first item in two ways. We separated out the respondents who said they seldom or never feel annoyed or angry at other people because we suspect this may reflect a tendency to deny feelings and thus, in some cases, a lack of self-awareness or overcontrol. However, when one interprets these responses, there are few striking differences on this item. For example, the percentage reporting at Time-1 that they seldom or never feel annoyed is virtually identical for the never users and the continuing polydrug users but is somewhat lower among the two groups of Time-1 polydrug users who later changed their pattern of use.

On the same item, respondents who say they feel annoyed at others fairly or very often are both recognizing and admitting to feelings of hostility. Here we find that the never users are less likely than the various groups of users to acknowledge these feelings. The differences are more pronounced at Time-2 than at Time-1.

The same generalization can be made (with a few exceptions) about the next item. The never users are more likely than others to deny being critical of others, and again the differences are sharpest at Time-2.

In general, then, we do not find very strong differences between never users and drug users with respect to admitting feelings of hostility, but the findings indicate that drug users are more likely to acknowledge such feelings than are the never users.

VI. Creativity/Autonomy

Items in this factor work fairly well in differentiating drug users from never users. In general, drug users are more likely to view themselves as creative or imaginative, individualistic, and curious or questioning; and they are more likely to say they believe in living life to the fullest, experiencing as many new things as possible. At least three of these items strongly suggest openness to new experience.

The item that discriminates most sharply is "Believe in living life to the fullest...." At both times it is the polydrug users who are most likely to espouse this value and the never users (with one or two exceptions) who are least likely to do so. The sobering effects of college may be evident in the rather sharp decline in the percentage of men describing themselves in these terms. The decline is greatest among men who change from current users at Time-1 to noncurrent users at Time-2 and among the Time-1 polydrug users who became marihuana-only users at Time-2.

The last item in this factor refers to a "need to get away from people and do things by yourself." To say that one seldom or never experiences this need for privacy may reflect a lack of autonomy or, conversely, a fear of isolation or a dependency on others for stimulation. At Time-1 a strong need for privacy is most likely to be denied by the never users, the marihuana-only users, and two of the three groups of men who did not become current users until Time-2. These differences are not great, however, and become even less so by Time-2. At Time-2, it is the continuing polydrug users who are least likely to deny a need for privacy (i.e., most likely to express a need for privacy).

VII. Outgoing/Expressive vs. Isolated/Withdrawn

In general, the items in this factor show disappointingly little relation to drug use, and the differences we find are sometimes difficult to interpret. At Time-1, for example, two of the three groups of current polydrug users are more likely than most of the other groups to say they easily show their feelings and emotions. At Time-2, however, it is two of the three groups of men who have remained or become nonusers who are more likely to describe themselves this way.

The adjective checklist item "loving, tender" is not consistently related to drug use at Time-1 (despite the high value placed on love by the counterculture). At Time-2, oddly enough, it is the never users and the continuing polydrug users who are least likely to describe themselves as loving and tender.

On the following item, men who are nonusers at Time-1 but current users at Time-2 are somewhat less likely than others to describe themselves as easygoing under pressure at Time-1, which may suggest a possible motivation for their subsequent drug use. However, there is no evidence here that stopping use helps in this respect because all three groups of men who became or remained noncurrent users are less likely than others to describe themselves as easygoing at Time-2.

Although the adjective "self-controlled" is not related to drug use as strongly as expected, these results are interesting in two respects. First, at Time-1 the polydrug users are somewhat less likely to describe themselves as self-controlled than are men in most of the other groups. Second, the comparison at Time-1 of the never users with the men who are nonusers at Time-1 but marihuana-only users at Time-2 provides one bit of evidence that some lack of self-control may be a predisposing factor in drug use.

The last two items suggest a tendency to avoid close personal relationships. This tendency appears to be somewhat more common among never users at Time-1 (but not at Time-2) than among drug users. Two of the three groups least likely at Time-1 to say they prefer to avoid interpersonal involvements are the men who later become polydrug users. The third is the group of men who were polydrug users at Time-1 but nonusers at Time-2, none of whom expressed a preference at Time-2 for avoiding involvement.

Although this item is closely related to the next, both manifestly and empirically, they differ from each other in their relation to drug use in one important respect. Whereas the two larger groups of Time-1 polydrug users were less likely than the never users to say, at Time-1, that they would rather stay free of involvement, they are just as likely as the never users (and more likely than other drug users) to describe themselves as being aloof and uninvolved. This raises a possibility that deserves further exploration: it may be that polydrug users tend to have relatively strong needs for interpersonal closeness but also some fear about or difficulty in achieving it.

VIII. Live for Now/Alienation

The items in this factor are concerned with a way of viewing and approaching life that is more oriented to the present than the future and is inclined to be pleasure-seeking as well as alienated. For the most part, drug users are more likely to describe themselves in these terms than are the never users. To avoid confusion, note that the percentages shown for the fourth item in this factor correspond to the response "describes me not at all."

On the first two items, the polydrug users are also more likely to express a "live for now" view than are the marihuana-only users, although the magnitude of the difference declines by Time-2, as do virtually all of the differences between the never users and the various groups of users. By Time-2, the former users and the more recent users are virtually indistinguishable from the never users.

"Feeling that the world is absurd and meaningless" clearly has a pessimistically existentialist ring, and responses to this item quite sharply differentiate the drug users (especially the polydrug users) from the never users. Again the differences are somewhat less sharp at Time-2. Among the Time-1 current users, only the continuing marihuana-only users show a trend toward increasing acceptance of this view.

The next item suggests a hedonistic orientation and is especially interesting because it is one of the few cases in which patterns of change in drug use are clearly related to corresponding trends in response to this item. Thus there is an increase in the percentage of those saying they "don't take life too seriously" in all three of the groups in which level of drug involvement has increased, i.e., MO to PD, NC to PD, and NC to MO. Similarly there is a decrease in all three groups in which level of involvement has decreased, i.e., PD to MO, PD to NC, and MO to NC. The continuing marihuana-only users also show some decrease from Time-1 to Time-2, whereas the continuing polydrug users show a slight increase.

The final item in this factor, "willingness to take advantage of someone who is better off than I am," expresses another version of exploitativeness. As in the earlier item implying sexual exploitation, never users are more likely than drug users to deny this statement at Time-1. Those who are least likely to deny the statement by Time-2 are the two groups of Time-1 polydrug users who continue to use drugs and the two groups who had become polydrug users at Time-2. At neither time do the continuing marihuana-only users differ greatly from the never users in this respect.

IX. Introspectiveness/Goal Orientation

The label given to this factor implies an important distinction because introspectiveness (or concern with self-understanding) appears to differentiate the drug users and never users much more clearly than does goal orientation.

For example, the first item is not strongly related to drug use at either time, although the percentage of men saying they give a lot of thought to future goals tends to be higher at Time-1 among men who become nonusers by Time-2, among men who are continuing polydrug users, and among men who are Time-1 marihuana-only users who escalate to polydrug use. Concern about future goals is least evident at Time-2 among (a) men who were polydrug users at Time-1, regardless of their subsequent use; (b) men who were nonusers at Time-1 but polydrug users at Time-2; and (c) the continuing marihuana-only users.

The majority of men on this campus report having given a lot of thought to their future career. Those who were polydrug users at Time-1 were somewhat less likely to have been so at Time-1, as were the continuing polydrug users (and those polydrug users who later became nonusers at Time-2.

The most striking differences in this factor pertain to self-awareness, i.e., the amount of time a person spends trying to understand himself and become more aware of his feelings and motivations. The never users are least likely, at both times, to devote a lot of time to self-understanding. Those who are most likely to be concerned with self-understanding at both times are the continuing polydrug users and the Time-1 marihuana-only users who become polydrug users at Time-2. It is interesting that the marihuana-only users who become nonusers show a rather sharp decline in concern about self-awareness, whereas the polydrug users who become nonusers show a comparable increase in concern.

X. Identifications with Significant Reference Groups

These three items are concerned with the extent to which men feel a sense of solidarity or identification with various groups: people of their own religion, people who use drugs, and their own family.

Not surprisingly, identification with drug users is highly associated with polydrug use at Time-1 but much less so with marihuana use. Moreover, among the current users at Time-1 identification with drug users at that time is highly predictive of whether these men will continue to be (or become) polydrug users or whether they will become nonusers. Notice the very sharp decline in identification with drug users that occurs by Time-2 among all three groups of Time-1 polydrug users. Thus, subgroup identification appears to be a less important issue for polydrug users at Time-2 than it was for them as entering freshmen. Note, too, that fewer of the marihuana-only users identify with drug users at Time-1 than do the polydrug users.

Identification with family is also associated (although less strongly) with drug use: never users, as one would expect, are more likely to identify with their families than are drug users. Among the users, those who use only marihuana are more likely to report a sense of identification with family at Time-1 than the polydrug users.

Least important, with respect to drug use, is identification with people of one's own religion. At both times the continuing polydrug users are less likely than others to report a sense of identification with this reference group; and at both times men who were polydrug users at Time-1 but nonusers at Time-2 were most likely to report a religious identification. Thus, in this small but interesting group spiritual values may have played some part in their earlier decision to use drugs and also in their later decision to turn away from drug use.

XI. Miscellaneous

The last two items in Table 1 deal with aspects of alienation that differ somewhat from those discussed earlier. Unlike the earlier items, this one suggests that both the never users and the drug users in general tend to agree that "...the world is a pretty selfish, dog-eat-dog affair." At Time-1, the continuing marihuana-only users are least likely to accept this view of human nature; but by Time-2 they are just as inclined as others to agree with it.

Drug users do differ from never users, however, in that they are more likely to foresee difficulties in finding a meaningful career and place in society. It should be noted, moreover, that this concern is expressed by much less than a majority, even among drug users.

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: Time-1 / Time-2

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)*
I. GENERAL NEUROTICISM		%	%	%	%	%	%	%	%	%	%	%	%
SCL†: Feeling unhappy, sad or depressed. (A GREAT DEAL)	Time-1	8	10	8	6	16	9	14	26	12	11	14	10
	Time-2	13	10	21	12	10	17	18	11	15	15	--	15
SCL: Feeling hopeless about the future. (SOME/A GREAT DEAL)	Time-1	16	21	19	12	26	22	28	37	25	31	25	22
	Time-2	27	30	30	24	22	28	41	26	35	30	--	30
SCL: Feeling tense or nervous. (SOME/A GREAT DEAL)	Time-1	39	38	42	18	43	33	40	53	33	34	36	37
	Time-2	44	48	48	24	45	46	44	53	48	46	--	45
SCL: Being absentminded. (SOME/A GREAT DEAL)	Time-1	26	28	27	6	34	28	29	26	21	36	29	28
	Time-2	26	38	28	41	34	33	39	32	27	40	--	32

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*In this and all following tables the 126 men who did not respond at Time-2 were not included in calculating the percentage shown in the last column.

†At Time-1 the SCL (symptom checklist) was introduced by: Since coming to the University how often have you been bothered or troubled by....? At Time-2 we asked: During the past 12 months, have you been bothered or troubled by....?

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: Time-1 / Time-2

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
II. EGO INTEGRATION I: PSYCHOLOGICAL WELL-BEING	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
ACL†: Feel guilty. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	24	26	24	18	33	20	29	26	12	24	23	24
	Time-2	25	28	25	29	28	30	16	37	27	25	--	26
How often, if ever, do you have the feeling that you're not living up to your own beliefs and values? (OFTEN)	Time-1	9	5	12	--	7	7	9	16	15	17	13	10
	Time-2	18	18	19	24	9	18	21	32	10	22	--	18
Have you (ever)(during the past year) felt upset and worried that you didn't have a better understanding of yourself? (YES)	Time-1	41	61	58	41	69	51	61	58	56	55	60	53
	Time-2	36	40	53	47	47	43	55	53	54	56	--	47
Was this (ever) a serious personal crisis for you (during the past 12 months)? (YES)	Time-1	6	23	14	12	19	14	19	32	29	25	23	16
	Time-2	13	16	28	24	14	21	33	32	25	22	--	21
Different ways of feeling about and doing things: Often feel torn between conflicting values and desires. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	34	46	38	41	41	44	50	47	40	48	52	42
	Time-2	49	61	59	41	43	57	59	58	54	57	--	55

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† The ACL (adjective checklist) was introduced by: Here are some words and phrases that people use to describe themselves. How well does each one describe the way you see yourself?

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: Time-1 / Time-2

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
II. EGO INTEGRATION I: PSYCHOLOGICAL WELL-BEING (Cont.)		%	%	%	%	%	%	%	%	%	%	%	%
ACL: Restless, discontented, (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	32	46	42	35	50	42	58	53	56	55	43	44
	Time-2	36	51	55	35	41	50	58	26	60	65	--	49
Here are some ways in which people sometimes wish they could be different. How often do you wish you could be more carefree and easy going? (OFTEN)	Time-1	17	7	12	12	17	13	12	16	12	20	8	14
	Time-2	13	16	14	6	19	11	16	26	19	16	--	14
Various ways people sometimes describe themselves: Many times I feel that I have too little influence over the things that happen to me. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	34	39	35	24	45	38	36	37	42	40	37	37
	Time-2	28	23	24	18	31	30	28	32	29	37	--	29
ACL: Bored. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	21	28	21	24	34	21	34	37	33	33	31	26
	Time-2	21	21	25	18	31	18	25	21	29	38	--	25
Different ways of feeling about and doing things: Find it easy to make decisions. (DESCRIBES ME A LITTLE/NOT AT ALL)	Time-1	29	28	20	18	26	25	28	21	29	29	32	26
	Time-2	22	30	24	24	29	24	20	32	33	29	--	25

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
II. EGO INTEGRATION I: PSYCHOLOGICAL WELL-BEING (Cont.)	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
When you think of the things that are important to you in life, how well satisfied are you with the way things are going for you? (NOT TOO/NOT AT ALL)	Time-1	18	16	15	12	22	13	24	26	21	21	23	18
	Time-2	30	25	35	12	19	22	19	26	42	20	--	26
How well do you feel you understand yourself, your feelings and motivations? (NOT TOO/NOT AT ALL)	Time-1	18	15	16	24	26	13	16	16	33	21	20	18
	Time-2	14	20	14	18	12	9	19	16	17	18	--	14
ACL: Self-confident. (DESCRIBES ME NOT VERY WELL/NOT AT ALL)	Time-1	27	26	25	6	33	20	34	21	23	28	27	26
	Time-2	25	25	24	6	33	18	19	47	29	24	--	24

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
III. EGO INTEGRATION II: AMOTIVATIONAL SYNDROME	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
ACL: Lazy. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	35	38	38	24	45	30	49	37	54	49	52	39
	Time-2	29	41	37	35	31	25	42	26	44	55	--	35
ACL: Procrastinating. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	52	51	58	41	57	60	65	53	67	62	64	58
	Time-2	52	66	63	65	55	56	69	53	73	69	--	60
Some ways in which people sometimes wish they could be different: How often do you wish you could settle down and take things more seriously? (SOMETIMES/OFTEN)	Time-1	39	43	38	41	41	29	29	21	23	31	40	34
	Time-2	32	33	47	24	33	28	31	16	44	38	--	34
Various ways people sometimes describe themselves: I often act on the spur of the moment without stopping to think of the consequences. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	30	39	27	29	38	31	41	26	40	52	37	35
	Time-2	19	30	28	24	24	24	30	16	27	40	--	26
ACL: Responsible. (DESCRIBES ME VERY WELL)	Time-1	28	31	30	35	29	32	31	26	23	16	19	28
	Time-2	37	38	38	35	34	33	31	53	25	15	--	33
ACL: Foresightful, plan ahead. (DESCRIBES ME NOT VERY WELL/NOT AT ALL)	Time-1	24	20	30	18	36	31	34	37	38	38	36	30
	Time-2	24	18	28	35	26	30	31	42	23	40	--	29
ACL: Studious. (DESCRIBES ME NOT VERY WELL/NOT AT ALL)	Time-1	23	39	30	12	31	40	52	53	38	45	45	36
	Time-2	29	33	42	35	29	40	50	47	42	45	--	38

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MD	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
IV. ATHLETIC/ENERGETIC/COMPETITIVE		%	%	%	%	%	%	%	%	%	%	%	%
ACL: Athletic. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	64	61	70	88	66	63	60	47	58	49	60	62
	Time-2	62	64	65	59	60	65	66	47	63	61	--	63
ACL: Energetic, active. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	73	80	77	77	72	77	74	74	69	70	69	75
	Time-2	77	84	73	59	74	82	74	84	65	75	--	76
ACL: Competitive. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	78	82	76	77	69	65	51	53	63	55	57	68
	Time-2	76	31	72	71	64	68	54	53	67	49	--	67
ACL: Attractive to girls. (DESCRIBES ME NOT VERY/NOT AT ALL WELL)	Time-1	35	26	32	6	26	14	15	11	23	17	21	23
	Time-2	32	23	26	18	17	18	10	11	25	22	--	23
ACL: Daring. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	38	49	42	24	38	50	48	58	54	60	46	46
	Time-2	41	51	57	41	45	52	62	53	50	55	--	50

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MD	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
IV. ATHLETIC/ENERGETIC/COMPETITIVE (Cont.)		%	%	%	%	%	%	%	%	%	%	%	%
Various ways people sometimes describe themselves: When I'm with girls, I sometimes try to see how much I can get in terms of sex. (DESCRIBES ME NOT AT ALL)	Time-1	45	31	35	24	24	26	14	16	10	18	24	28
	Time-2	50	36	23	29	43	30	22	63	31	27	--	35
ACL: Ambitious. (DESCRIBES ME NOT VERY/NOT AT ALL WELL)	Time-1	16	20	16	12	22	21	34	21	42	34	29	23
	Time-2	21	25	25	24	22	23	34	42	40	44	--	28
Thinking back over your father's life, how similar or different would you like your own life to be? (SIMILAR IN MOST/MANY RESPECTS)	Time-1	39	39	33	47	21	41	38	21	19	25	29	34
	Time-2	33	30	28	41	28	30	38	26	23	21	--	30

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: Time-1 / Time-2

		Never Used	Noncurrently (NC) or Never NC	Noncurrently (NC) or Never MO	Noncurrently (NC) or Never PD	Marih. Only (MO) NC	Marih. Only (MO) MO	Marih. Only (MO) PD	Polydrug (PD) NC	Polydrug (PD) MD	Polydrug (PD) PD	Non-Resp. Time-2	All Time-2 Resp.
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
V. TOLERANCE VS. INFLEXIBILITY/HOSTILITY													
ACL: Tolerant, accepting of others. (DESCRIBES ME VERY WELL)	Time-1	27	23	25	6	22	31	25	21	25	37	21	27
	Time-2	24	21	34	18	19	30	26	21	23	27	--	26
VCL†: Value tranquility, harmony, inner peace. (DESCRIBES ME VERY WELL)	Time-1	28	25	26	35	29	29	34	47	42	37	36	31
	Time-2	28	30	30	29	33	34	40	58	38	29	--	33
ACL: Uncompromising. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	27	34	29	29	33	27	31	26	38	43	26	31
	Time-2	23	34	22	41	24	23	22	16	27	29	--	25
ACL: Argumentative. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	48	59	59	65	66	57	64	63	60	60	63	57
	Time-2	55	67	58	65	60	57	56	42	69	56	--	58
Various ways people sometimes describe themselves: I am willing to disregard the feelings of others in order to accomplish something that is important to me. (DESCRIBES ME NOT AT ALL)	Time-1	35	26	33	18	28	35	22	37	25	31	26	31
	Time-2	38	39	34	18	31	35	26	47	27	21	--	33

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† The VCL (values checklist) was introduced by: These statements describe people with various kinds of goals and values. How well does each one describe you?

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: Time-1 / Time-2

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
V. TOLERANCE VS. INFLEXIBILITY/HOSTILITY (Cont.)	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
How often do you find yourself feeling either annoyed or angry at other people? (SELDOM/NEVER)	Time-1	37	36	31	35	31	43	34	26	27	38	32	36
	Time-2	41	34	40	53	28	35	38	47	35	33	--	37
....(FAIRLY/VERY OFTEN)	Time-1	16	23	19	18	22	18	19	21	19	21	25	19
	Time-2	7	10	11	18	16	18	11	26	23	19	--	14
ACL: Critical of others. (DESCRIBES ME NOT VERY/NOT AT ALL WELL)	Time-1	48	36	45	6	50	44	34	63	38	42	40	43
	Time-2	45	39	41	29	29	30	35	37	38	33	--	37

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MD	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
VI. CREATIVITY/AUTONOMY		%	%	%	%	%	%	%	%	%	%	%	%
ACL: Creative, imaginative. (DESCRIBES ME VERY WELL)	Time-1	14	16	18	--	19	23	20	11	19	19	29	18
	Time-2	17	18	21	35	26	24	26	32	25	26	--	23
ACL: Individualistic. (DESCRIBES ME VERY WELL)	Time-1	20	34	31	18	24	32	23	26	29	25	33	27
	Time-2	30	43	40	18	33	34	33	32	40	33	--	34
ACL: Curious, questioning. (DESCRIBES ME VERY WELL)	Time-1	32	51	37	18	45	36	44	47	52	45	44	39
	Time-2	29	39	40	47	43	37	39	32	56	46	--	38
VCL: Believe in living life to the fullest, experiencing as many new things as possible. (DESCRIBES ME VERY WELL)	Time-1	29	38	30	12	36	40	42	53	54	53	45	38
	Time-2	17	30	24	41	19	33	44	32	27	44	--	29
Thinking now of the ways you like to spend your free time, how often do you feel you have a strong need to get away from people and do things by yourself? (SELDOM/NEVER)	Time-1	30	18	31	47	29	28	30	16	23	18	29	27
	Time-2	25	20	20	35	21	27	19	32	23	13	--	22

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: Time-1 / Time-2

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MD	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
VII. OUTGOING/EXPRESSIVE VS. ISOLATED/WITHDRAWN		%	%	%	%	%	%	%	%	%	%	%	%
Different ways of feeling about and doing things: Easily show my feelings and emotions. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	46	57	44	41	43	49	55	58	44	60	52	49
	Time-2	51	67	50	48	50	54	58	63	44	56	--	54
When you do get angry at others, how often do you find it difficult to control your temper? (NEVER)	Time-1	30	21	30	24	24	27	36	26	19	37	24	29
	Time-2	28	23	33	24	22	28	31	26	33	38	--	29
....(SOMETIMES/USUALLY)	Time-1	21	18	21	18	19	17	10	16	19	13	25	18
	Time-2	14	16	13	18	10	14	18	11	12	11	--	14
ACL: Loving, tender. (DESCRIBES ME VERY WELL)	Time-1	15	21	13	12	17	20	21	5	17	21	21	17
	Time-2	18	25	22	24	34	24	31	42	23	17	--	23
Various ways people sometimes describe themselves: I am easygoing, even under pressure. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	55	59	46	47	50	60	60	63	56	57	54	56
	Time-2	55	46	50	53	45	56	59	42	58	57	--	54

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
VII. OUTGOING/EXPRESSIVE VS. ISOLATED/WITHDRAWN (Cont.)	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
ACL: Self-controlled. (DESCRIBES ME VERY WELL)	Time-1	28	21	19	24	26	25	29	16	19	22	21	24
	Time-2	25	25	33	29	22	20	25	32	27	22	--	25
Various ways people sometimes describe themselves: I would rather stay free of involvement with others than to risk disappointments. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	26	18	23	12	24	20	12	5	17	19	13	20
	Time-2	22	16	19	24	24	17	21	--	29	19	--	20
ACL: Aloof, uninvolved. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	38	25	30	24	33	24	28	26	42	38	31	32
	Time-2	34	31	35	59	34	31	26	11	40	38	--	33

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
VIII. LIVE FOR NOW/ALIENATION		%	%	%	%	%	%	%	%	%	%	%	%
Ways in which different people approach life: The future is so uncertain that we might as well live mostly for the present. (AGREE SOMEWHAT/STRONGLY)	Time-1	22	18	21	18	31	33	41	47	40	49	31	31
	Time-2	25	26	28	29	22	36	38	26	31	42	--	31
Different ways of feeling about and doing things: Have the feeling that the world is absurd and meaningless. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	16	26	25	12	29	27	36	37	48	44	44	28
	Time-2	18	21	32	41	29	33	31	32	38	42	--	29
VCL: Doesn't take life too seriously, greatly values pleasure, has a lot of fun. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	30	48	31	18	40	47	39	37	48	44	49	39
	Time-2	29	39	34	35	31	41	56	26	35	47	--	38
Various ways people sometimes describe themselves: If someone is better off financially than I am, I don't mind taking advantage of him. (DESCRIBES ME NOT AT ALL)	Time-1	60	49	54	65	53	54	42	32	52	47	48	53
	Time-2	58	54	53	47	60	55	42	74	46	39	--	53

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: Time-1 / Time-2

IX. INTROSPECTIVENESS/GOAL ORIENTATION		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
People differ in the amount of time they spend trying to decide where they are heading and what their future life goals are. How much thought do you give to your future goals? (A LOT)	Time-1	52	62	52	53	60	54	65	74	52	60	59	56
	Time-2	60	57	60	47	60	50	65	47	52	51	--	56
How much have you thought about what career or occupation you might choose after you finish your formal education? (A LOT)†	Time-1	58	56	58	53	59	57	56	47	46	44	55	55
	Time-2	53	66	56	53	52	51	52	37	58	40	--	52
Some people spend quite a bit of time trying to understand themselves and become more aware of their inner feelings and motivations. Others don't give this much thought. How much thought do you give to trying to understand your feelings and motivations? (A LOT)	Time-1	37	56	46	47	53	52	61	53	48	63	63	50
	Time-2	38	43	52	47	40	50	58	63	46	63	--	48

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†At Time-2 this question was asked in terms of the past 12 months.

Table 1. EGO INTEGRATION AND OTHER PERSONALITY VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrently (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MD	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
X. IDENTIFICATIONS													
With which of the following groups, if any, do you feel a sense of solidarity and identification? (PEOPLE OF YOUR OWN RELIGION)	Time-1	22	20	18	24	16	17	14	26	17	12	12	18
	Time-2	14	15	[illegible]	12	7	8	15	26	13	4	--	11
....(PEOPLE WHO USE DRUGS)	Time-1	1	5	1	6	3	8	28	21	40	46	19	13
	Time-2	--	--	4	35	--	8	30	--	8	26	--	9
....Is there one group you feel most strongly identified with? (MY FAMILY)	Time-1	31	34	28	24	22	15	19	11	6	8	17	21
	Time-2	27	20	16	6	12	21	14	16	23	9	--	19
XI. MISCELLANEOUS													
Some statements about human nature and social relationships: Whatever people say about it, the world is a pretty selfish, dog-eat-dog affair. (AGREE SOMEWHAT/STRONGLY)	Time-1	53	48	46	47	53	42	58	53	62	57	52	51
	Time-2	65	72	68	76	67	65	61	53	71	57	--	65
How easy or hard do you think it will be to find a meaningful career and place in society? (VERY DIFFICULT/IMPOSSIBLE)	Time-1	11	20	18	18	12	21	22	21	21	20	21	18
	Time-2	18	13	25	24	19	27	22	42	25	24	--	23

APPENDIX B

Relation of the Drug Change Index to Interpersonal Items

I. Satisfaction with Relationships with Women

Responses to the first two items in this factor signify different ways of getting at problems in relationships with women. Although the two items are highly related, the results are quite different in relation to drug use. Thus, at Time-1 the never users were much more likely to say they did not date girls than the drug users. For the most part, however, they were no more likely than the drug users to say that in general they were not at all or not too satisfied with their relationships with women. Apparently the never users had lower expectations in this area than did the drug users.

The 106 men who changed from nonusers to marihuana-only users were more likely than others to express dissatisfaction at Time-1, which may have influenced their decision to become drug users. If it did, they may have been disappointed because they were just as likely to be dissatisfied at Time-2, even though very few of them said they were not dating at Time-2. Among the Time-1 marihuana-only users we see the familiar pattern in which the men who change either to nonusers or to polydrug users are more likely to express dissatisfaction at Time-1 than are the continuing marihuana-only users. By Time-2 the differences between these three groups have almost disappeared.

If anything, by Time-2 the never users are somewhat more likely than others to be dating frequently or regularly. However, some of these differences can be attributed to the fact that men who were already drug users at Time-1 were much more likely than others to be living with a girlfriend at Time-2. (Respondents who were married or living with a girlfriend at Time-2 were not asked the dating question.) It should be noted that current drug use at Time-1 is more highly related to living with a girlfriend at Time-2 than is current drug use at Time-2. This suggests that men who have been involved in the drug subculture longer are more apt to adopt this particular life-style than men who became involved in the drug subculture later.

The previous items indicate, in general, that men who use drugs are more likely than never users to be involved in relationships with women. Responses to the next item demonstrate this in another way: never users are less likely than most members of the other groups to describe themselves as being very dependent on one or more close friends of the opposite sex. There is an unusual pattern of differences among the drug users, however. Within each of the three sets of current users or men who become users, it is the men who remain or become marihuana-only users at Time-2 who at Time-2 are reluctant to say that they are dependent on female friends.

Uneasiness around girls at Time-1 is a more common characteristic of the never users than of most members of the other groups, with the exception of men who were using marihuana-only at Time-1 but were nonusers at Time-2; but this uneasiness of the never users is not reflected in trouble meeting girls because they do not differ a great deal from any of the larger groups of drug users. For the most part, the never users are less likely than the users to report being bothered by feeling lonely. In this respect, they are similar to the continuing marihuana-only users.

In general, then, the never users tend to differ most from the drug users in terms of their life-style and patterns of relationships with women, but they differ relatively little in terms of their feelings of satisfaction in this area.

The item "feeling lonely" deserves additional comment because it reveals some exceedingly suggestive results. The pattern that emerges here suggests that reducing level of use from Time-1 to Time-2 is associated with a decline in the percentage of men reporting feelings of loneliness, whereas increasing or maintaining the same level of use is associated with the reverse. Thus, there are three groups in which there are fewer men reporting feelings of loneliness at Time-2 than at Time-1: those who were marihuana-only users at Time-1 and nonusers at Time-2, and those who were polydrug users at Time-1 and nonusers at Time-2, and those who were polydrug users at Time-1 and marihuana-only users at Time-2. The greatest increases in the percentages reporting loneliness occur among men who were nonusers at Time-1 and who subsequently became either marihuana-only users or polydrug users at Time-2. We also find some increase in loneliness among men who were polydrug users at both times and those who were marihuana-only users at both times; but the latter are no more likely than the never users, at either time, to report being bothered by feelings of loneliness. At Time-2, prevalence of concern about loneliness is highest among men who changed from nonusers at Time-1 to marihuana-only users at Time-2. Their responses to the last item in this factor (satisfaction with relationships with girls) may provide a clue to the problem. These men were more likely than any others to report dissatisfaction in this area at Time-1 (which may help to explain why they turned to marihuana use) and also at Time-2 (which suggests that whatever hopes they may have had, these hopes were not likely to be realized.)

II. Expressivness

The factor "expressiveness" is discussed in the section entitled Outgoing/Expressive vs. Isolated/Withdrawn," Appendix A.

III. Anxiety About Interpersonal Relationships

Only one item in this factor consistently differentiates never users from drug users: in general, the never users are more likely at both times to say they wish they could be more relaxed around other people, just as in Factor I they were more inclined to complain about being uneasy around girls. At both times, the continuning marihuana-only users are the least likely to say they wish they could be more relaxed around other people.

On the three items suggesting problems in interpersonal relationships, it is the continuing marihuana-only users who appear more likely to be "better adjusted" than others at Time-1 but not necessarily at Time-2. The same group, along with the polydrug users at Time-1 and the nonusers who become polydrug users, are less inclined than others at Time-1 to respond that it is important to them to be well liked. This finding may raise some doubts about the validity of this item in drug surveys in view of growing evidence from many studies of the importance of peer group influences in drug use.

On the last item, "Having trouble finding congenial friends you can feel really close to," five of the nine groups of drug users differ as much from the other drug users as they do from the never users at Time-1. The item may be useful in predicting change in patterns of use, however, because three of the groups most likely to report trouble in this area at Time-1 are the men who are nonusers at Time-2. The other two groups are the Time-1 nonusers who become polydrug users and the continuing polydrug users. Their responses to this item and the item on loneliness (Factor I) suggest that the continuing polydrug users may tend to have problems in interpersonal relationships. Note also that the Time-1 polydrug users who become nonusers and the nonusers who become polydrug users show a sharp decline in the percentage reporting problems in this area.

IV. Hostility

The factor "hostility" is discussed in the section entitled "Tolerance vs. Inflexibility/Hostility," Appendix A.

V. Relationships with Father

Three of the four items in this factor do a good job of distinguishing never users from current drug users. On all four items, the continuing polydrug users are more likely to report problems or tension in relationships with their fathers than the never users are.

All three groups of Time-1 polydrug users are more likely than the never users to say they were not very or not at all close to their fathers, as were the marihuana-only users who became nonusers. The polydrug users who became marihuana-only users improved considerably in this area by Time-2. (At Time-2, this item was asked in terms of relationships during the past year.)

The next item is exceptionally predictive at Time-1 of whether a Time-1 current user will become a nonuser, a marihuana-only user, or a polydrug user at Time-2. At Time-2 all three groups of polydrug users are most likely to report that their fathers would not approve of their life-style.

At Time-1, perceptions of tension in relationships with their fathers are more prevalent among drug users (especially the current users) than among never users. By Time-2, these differences have largely disappeared, except among the continuing polydrug users, although even this group is less likely to report tension than they were at Time-1.

Responses to the last item indicate a denial of the wish to model one's life after one's father. We expected more differentiation on this item than we found. However, note that all three of the Time-1 current users who reduce their level of use (to nonuse or from polydrug use to marihuana-only use) show a decline in the percentage giving this response. The continuing marihuana-only users are virtually identical with the never users at both times, with neither group showing any marginal change. In all of the other groups there is at least some increase in the percentage of men saying they would like their own lives to be similar to that of their fathers in few or no respects.

VI. Friends

As one would expect from Time-1 to Time-2 there is a substantial increase among all groups in the percentage reporting they have many friends. The never users do not differ appreciably from most of the user groups at Time-1. At Time-2, groups most likely to report having a lot of friends are the continuing marihuana-only users, the continuing polydrug users, and the Time-1 marihuana-only users who became polydrug users.

Again, at Time-1 the never users do not differ much from the others in reporting that they have several or many close friends. By Time-2, the marihuana-only users who became polydrug users are more likely than any other group to say they have several close friends. The three groups of Time-2 nonusers are least likely to report having several or many close friends, although very few in any of the groups report having no close friends at all.

The final item, dependency on male friends, does not discriminate at Time-1, although the men who remain or become marihuana-only users are somewhat less likely to report such dependency. Interestingly, it is these same three groups who are most likely at Time-2 to say they are very dependent on one or more close friends. At Time-1 the continuing polydrug users are more likely than any others to describe themselves as dependent on male friends.

Table 2: ROLE INTEGRATION VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrent (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD.	NC	MO	PD	NC	MO	PD		
I. SATISFACTION WITH RELATIONSHIPS WITH WOMEN	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
How satisfied are you with the relationships you've had with girls (during the Fall Quarter)(over the past year)? (NOT TOO/NOT AT ALL)†	Time-1	45	46	58	35	53	40	51	37	44	45	37	46
	Time-2	44	43	61	35	43	41	39	21	46	44	--	44
How often did you date girls (during the Fall Quarter)(over the past year)? (DIDN'T DATE)	Time-1	53	30	44	47	38	27	31	37	42	34	29	39
	Time-2	25	18	10	6	22	11	8	32	15	20	--	17
....(DATED FREQUENTLY/REGULARLY)	Time-1	11	25	10	12	14	25	14	16	10	22	22	17
	Time-2	28	26	25	24	22	30	19	5	15	18	--	24
Currently married.	Time-2	2	10	--	--	3	2	--	11	10	1	--	3
Not currently married: lived with girlfriend during past year.	Time-2	3	5	6	6	16	16	21	21	19	17	--	12
Various ways people sometimes describe themselves: I am very dependent on one or more close friends of the opposite sex. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	26	41	21	53	29	31	45	37	31	39	33	32
	Time-2	33	33	26	35	48	40	43	47	35	42	--	37

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†At Time-1 this question was asked in terms of the respondent's. At Time-2, if the respondent was living with his wife or girlfriend, the question was asked with reference to her; otherwise it was asked with reference to girls in general.

Table 2. ROLE INTEGRATION VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrent (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
I. SATISFACTION WITH RELATIONSHIPS WITH WOMEN (Cont.)	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
ACL: Uneasy around girls. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	50	33	34	24	52	28	35	32	25	34	28	37
	Time-2	41	26	31	18	38	28	26	32	38	33	--	33
SCL: Feeling lonely. (BOTHERED SOME/ A GREAT DEAL)	Time-1	39	51	43	29	52	38	45	47	52	51	43	44
	Time-2	44	52	66	47	45	46	51	26	46	58	--	50
PCL†: (Having trouble) meeting girls. (MODERATELY/VERY SERIOUS)	Time-1	31	25	39	18	29	27	31	16	25	27	29	29
	Time-2	35	26	42	24	28	32	30	16	38	37	--	33

II. EXPRESSIVENESS

(See Table 1, Factor VII)

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†The PCL (problem checklist) was introduced at Time-1 by: How serious a problem or worry is each of the following for you at the University? At Time-2 this was asked as a separate question: During the past 12 months, how serious a problem or worry has it been to meet girls?

Table 2. ROLE INTEGRATION VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: Time-1 / Time-2

		Never Used	Noncurrent (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
III. ANXIETY ABOUT INTERPERSONAL RELATIONSHIPS	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
		%	%	%	%	%	%	%	%	%	%	%	%
ACL: Feel guilty. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	24	26	24	18	33	20	29	26	12	24	23	24
	Time-2	25	28	25	29	28	30	16	37	27	25	--	26
Here are some ways in which people sometimes wish they could be different. How often do you wish you could be more relaxed when you're around other people? (OFTEN)	Time-1	34	21	25	29	38	17	24	26	27	29	20	27
	Time-2	35	25	29	24	29	20	29	26	29	29	--	28
How important is it to you to be well liked? (FAIRLY/VERY)	Time-1	75	77	80	59	81	66	71	68	69	67	71	72
	Time-2	72	80	77	76	72	75	80	58	65	67	--	74
PCL: (Having trouble) finding congenial friends you can feel really close to. (A MODERATELY/VERY SERIOUS PROBLEM)	Time-1	29	38	30	53	38	25	30	42	29	37	33	31
	Time-2	26	34	31	18	29	27	18	21	21	34	--	27

IV. HOSTILITY

(See Table 1, Factor V)

Table 2. ROLE INTEGRATION VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrent (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
V. RELATIONSHIPS WITH FATHER		%	%	%	%	%	%	%	%	%	%	%	%
In general, how close (did) do you feel to your father (when you were in high school)? (NOT VERY/NOT AT ALL)	Time-1	20	25	25	24	34	27	25	32	38	38	30	27
	Time-2	17	23	25	18	29	31	23	37	21	36	--	25
Assuming your father knew quite a bit about your general way of life and the way you spend your time, do you think he would....? (DISAPPROVE MILDLY/STRONGLY)	Time-1	20	20	22	12	31	37	51	37	44	56	40	33
	Time-2	25	34	32	65	33	45	54	26	40	56	--	39
Regardless of how close they are to their parents, people sometimes experience conflict or tension in their relationships with them: How much conflict or tension is there in your relationship with your father? (A LOT)	Time-1	7	7	13	6	14	11	16	16	15	25	16	13
	Time-2	8	10	12	6	9	12	9	11	8	18	--	11
Thinking back over your father's life, how similar or different would you like your own life to be? (SIMILAR IN FEW/NO RESPECTS)	Time-1	21	16	11	6	26	21	11	42	21	29	27	20
	Time-2	22	21	21	18	16	20	16	26	15	33	--	21

Table 2. ROLE INTEGRATION VARIABLES BY INDEX OF CHANGE IN CURRENT DRUG USE

Current Drug Use: $\frac{\text{Time-1}}{\text{Time-2}}$

		Never Used	Noncurrent (NC) or Never			Marih. Only (MO)			Polydrug (PD)			Non-Resp. Time-2	All Time-2 Resp.
			NC	MO	PD	NC	MO	PD	NC	MO	PD		
	(N)	(187)	(61)	(106)	(17)	(58)	(169)	(80)	(19)	(48)	(89)	(126)	(834)
VI. FRIENDS		%	%	%	%	%	%	%	%	%	%	%	%
How many of the students you know here at the University would you call your friends? (MANY)†	Time-1	27	34	29	24	29	32	38	26	31	28	26	30
	Time-2	47	44	53	47	50	57	61	42	42	54	--	51
Now how about really close friends among students here at the University? Would you say you have....? (NONE)	Time-1	23	20	16	6	21	10	14	16	21	17	20	17
	Time-2	12	11	6	--	5	9	1	--	17	4	--	8
....(SEVERAL OR MANY)	Time-1	33	26	32	24	43	41	35	37	38	31	35	35
	Time-2	45	34	42	41	33	43	59	21	35	38	--	42
Various ways people sometimes describe themselves: I am very dependent on one or more close friends of my own sex. (DESCRIBES ME MODERATELY/VERY WELL)	Time-1	24	21	18	29	22	18	24	21	19	35	26	23
	Time-2	18	23	28	24	19	27	23	21	33	26	--	24

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†At Time-2 the question was: Thinking of the people about your own age on campus (or, if you are not a student, in your local community) how many would you call your friends?

NOTES

[1] For a full description of the anonymity procedures and other methods used to assure respondents' confidence and cooperation see Manheimer, Mellinger, Somers, and Kleman, 1972. This investigation was supported by PHS Research Grant No. 1 R01-DA00647 under the National Institute on Drug Abuse.

SOME COMMENTS ON THE RELATIONSHIP OF SELECTED CRITERIA VARIABLES TO ADOLESCENT ILLICIT DRUG USE

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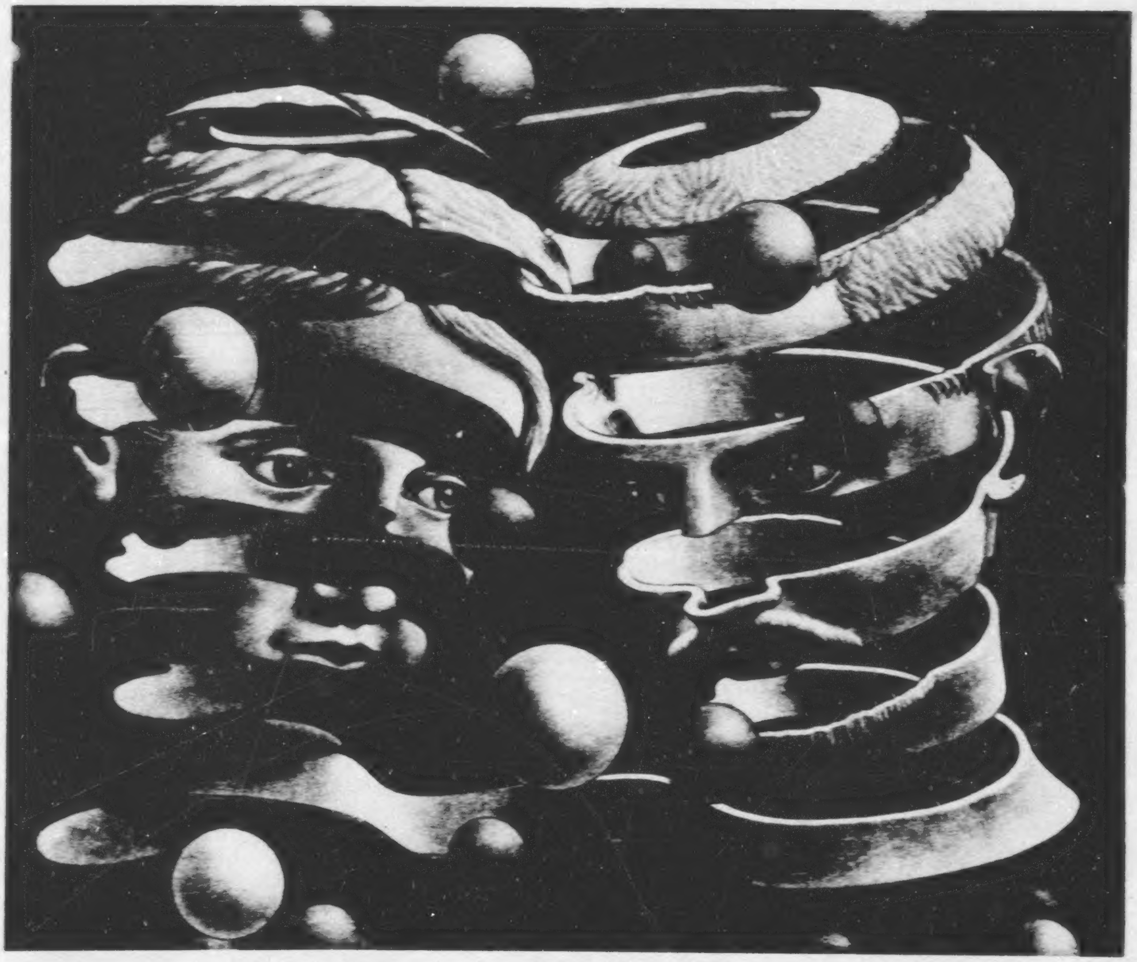

Plate 20

SOME COMMENTS ON THE RELATIONSHIP OF SELECTED CRITERIA VARIABLES TO ADOLESCENT ILLICIT DRUG USE

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A major problem in social science is the lack of replication and continuity in research. Rarely is the same problem studied more than once; and even when it is, rarely are the same methods used in different studies. In this context, the current efforts of the National Institute on Drug Abuse and of the Special Action Office for Drug Abuse Prevention (SAODAP) to foster the development of standard measures in drug research are significant. For the past year, a committee sponsored by SAODAP has considered the issues and potential solutions involved in operationalizing concepts related to the measurement of drug use, such as any use ever of a particular substance, recency of use, frequency of use, polydrug use, and typologies of drug use. The present concern with the measurement problems posed by the correlates of drug use is complementary. These two concurrent sets of activities can be expected to have a significant impact in the field of drug research since they encompass the independent and dependent variables to be included in any particular study with a psychological or sociological emphasis.

This paper has two aims: (1) it provides a brief review of selected findings in the drug literature on the correlates of illicit drug use among adolescent populations, and (2) it reviews our own research in greater detail in order to provide some recommendations based on our experience.

SELECTED PREVIOUS RESEARCH

There are no well-formulated theories to explain drug use by young people. Nevertheless various interpretations of drug behavior can be identified which emphasize one of three classes of variables: (1) sociodemographic, (2) personal attributes which include (a) personality characteristics and (b) life-style variables, and (3) interpersonal influences of either (a) peers or (b) family.

Most epidemiological studies have focused on the relationship of background factors to marihuana use (Glenn & Richards, 1974). Use increases consistently with age during the high school years (Blackford, 1974; Josephson, Haberman, Zanes, & Elinson, 1972; National Commission on Marihuana and Drug Abuse, 1972; Wolfson, Lavenhar, Blum, Quinones, Einstein, & Louria, 1972). In college and high school, boys are more likely than girls to use marihuana (Clarke & Levine, 1969; Goode, 1970; Governor's Citizen Advisory Committee, 1969; Johnson, 1973; Roth, 1972); however, there are indications that this difference may be narrowing (Blackford, 1974; Josephson, 1974; Josephson, et al., 1972; National Institute on Drug Abuse, 1974; Wolfson, et al., 1972). Children from families of high socioeconomic status are more likely to use marihuana than children from less well-to-do families (Goode, 1970; Johnson, 1973; Johnston, 1973; Josephson, et al., 1972; Udell & Smith, 1969).

Differences among ethnic groups are inconclusive. While blacks are highly overrepresented among populations of adult opiate addicts (Ball & Chambers, 1970), no consistent trends appear regarding marihuana use in adolescent populations (Glenn & Richards, 1974). One study reports higher rates of marihuana use among black than white high school students (Johnston, 1973); several report higher rates among whites (Glenn & Richards, 1974); other studies report no association between race and marihuana use (Chambers, 1971; Goode, 1972; Johnson, 1973). Differences along religious backgrounds are large. Jewish youths or those with no religious affiliation are the most likely, Catholics are the least likely to be marihuana users (Glaser & Snow, 1969; Goldstein, Korn, Abel, & Morgan, 1970; Johnson, 1973). Generally higher rates of marihuana use are found in suburban and urban high schools than in schools located in small towns or in rural areas (Glenn & Richards, 1974; Goldstein, et al., 1970; Governor's Citizen Advisory Committee, 1969; Josephson, et al., 1972; Johnston, 1973; National Commission on Marihuana and Drug Abuse, 1972).

Anxiety, depression, and impulsiveness have been singled out as intrapsychic states reflective of personality maladjustment for which drug use provides escape and relief (Braucht, et al., 1973; Haagen, 1970; National Commission on Marihuana and Drug Abuse, 1972). Radical political ideology, lack of religiosity, low academic interest (Jessor, Jessor, & Finney, 1973; Johnson, 1973; Johnston, 1973; Lavenhar, Wolfson, Shesset, Einstein, & Louria, 1972), or estrangement from parents (Tec, 1970) have been singled out as life-style variables expressive of youth rebellion against society and identification with a 'counter culture" (Keniston, 1968; McGothlin, 1971; Suchman, 1968). Illicit drug use is seen as a way of rejecting conventional values, which are embodied for the adolescent in established institutions such as the family, the school, or the church. On the other hand, these are also indications that use of illicit drugs, especially use of marihuana, may not always be associated with psychopathology (Grant, Rochford, Fleming, & Stunkard, 1973) or lack of interest in academic matters (Hochman & Brill, 1973) or reduced pattern of work activity (Mendelson & Meyer, 1972).

Among interpersonal factors, peers and family variables emphasize the role of the proximate social milieu. Drug use is seen as behavior which develops in response to the immediate social situation of the individual and the interpersonal influences to which he or she is exposed. An important sociological tradition singles out the role of peers in the genesis of drug use and the development of adolescent drug subcultures. Becker (1953, 1955) and Goode (1969) have stressed that friends are important in influencing others to start using drugs, not only by supplying the drug but by providing an example and defining the nature of the physiological experience. This interpretation is compatible with Sutherland's differential association theory (Sutherland & Cressey, 1970), in which deviant behavior is assumed to develop as a function of the preponderance of such behavior in the peer group. Numerous studies document an association between adolescents' illicit drug use and their perceptions of drug use among their friends (Elseroad & Goodman, 1970; Josephson, 1974; Jessor, Jessor, & Finney, 1973; Johnson, 1973; Lavenhar, et al., 1972).

More recently, another interpersonal interpretation has proposed that drug use on the part of the young develops in response to parental behaviors and the widespread use of legal drugs in society at large (Lennard, Epstein, Bernstein, & Ransom, 1971; Mellinger, 1971; Smart & Fejer, 1972). The legal substances include those used for recreational purposes, such as alcohol and tobacco, and those prescribed medically to affect changes in mood and psychological states, the so-called psychoactive drugs (i.e., tranquilizers, stimulants, and barbiturates). These two interpersonal interpretations of adolescent drug use obviously have opposite implications (Kandel, 1974a,b). The emphasis on peers implies discontinuity between the generations, while emphasis on parents implies continuity between the generations, parental behavior potentially having unanticipated and unwanted consequences on their children.

These three classes of factors are not independent. As the result of different child-rearing practices or life experiences, adolescents belonging to different strata in society may develop different personality traits, adopt different life-styles, or engage in different interpersonal relations. Similarly, certain personality characteristics may lead to particular life-styles and vice versa.

While one or more classes of factors have been investigated in a particular research, most studies have not assessed systematically the relative import of different classes of variables by considering them simultaneously in the same multivariate analysis. Large-scale polls based on representative samples have examined the distribution of rates of use according to sociodemographic variables (Abelson, 1972, 1973; Gallup, 1969). Clinical studies based on small samples emphasize personality or psychiatric factors (e.g. Brill, Crumpton, & Grayson, 1971; Horman, 1973; Kolansky & Moore, 1971; McAree, Steffenhagen, & Zheutlin, 1972). Small-scale surveys based on selected high school or college populations describe life-style variables or interpersonal influences (Johnson, 1973).

The rare studies which have attempted to estimate the effect of different factors on drug use have certain limitations. Only background and school experience variables are examined in Johnston's (1973) study based on retrospective reports of drug use while in high school by a national sample of high school boys. A larger and more varied set of factors were examined with stepwise multiple regression analyses in two studies based on students in selected high schools (Jessor, et al., 1973; Lavenhar, et al., 1972). However, the assessment of interpersonal influence in these studies was inferred from the students' perceptions rather than the friends' or parents' reports of the students' behaviors and attitudes.

Indeed, in addition to the absence of a comprehensive approach, prior studies share a serious measurement problem. Interpersonal influences have been determined from adolescents' perceptions of parental drug use (Smart & Fejer, 1972) or peer drug use (Jessor, et al., 1973; Johnson, 1973; Josephson, et al., 1972) rather than from independent reports by significant others. Statistical associations based on perceptions tend to be inflated because the adolescent's own patterns of drug use partially determine the perception of drug use by others around him, whether peer or parent (Kandel, 1974a). The assessment of the separate and mutual interpersonal influence of peers and parents on adolescents' values and behaviors requires matched relational samples so that the degree of similarity and/or differences in values and behaviors within and between generations can be assessed on the basis of self-reports rather than perceptions (Kandel & Lesser, 1972; Kandel, 1974b).

THE NEW YORK STATE BIOMETRICS RESEARCH SURVEY

The present recommendations for specific life-style items to be used in drug research are very much dependent upon our results from the longitudinal survey of high school students carried out in New York State. Certain methodological features of the study, as well as analytical strategies derived from our findings about patterns of drug use over time, provide important new insights into the correlates of drug use. First, relational samples were used to obtain direct assessments of parental and peer behaviors and their influence on adolescents. Second, precise estimates of the relationship among adolescent drug use and various demographic, personal, and interpersonal factors were obtained through multiple classification analysis (Andrews, Morgan, & Sonquist, 1969), a form of dummy variable regression analysis. Finally, three levels of illicit drug behavior were differentiated: (a) probability of marihuana use, (b) frequency of marihuana use, and (c) probability of use of other illicit drugs among marihuana users. Different processes and factors are clearly involved at each level of illicit drug use. This finding underscores a major conclusion of our research. The identification of relevant criteria variables must be stated in reference to specific types and stages of drug use. For example, peer behavior is most important with respect to marihuana use. If their friends use marihuana, most adolescents will also engage in such use, irrespective of sociodemographic, psychological, or familial characteristics. However, progression to other drugs does not depend as strongly on values and activities characterizing the peer group. The quality of relationship between parent and adolescent and the adolescent's general level of personal and school performance become important.

Since the study design has been described in detail elsewhere (Kandel, 1973; Kandel, 1974a,b; Single, Kandel, & Faust, 1974; Single, Kandel, & Johnson, 1975), only a brief description is provided here.

METHOD

Sample

The data come from a subsample of adolescent-parent-best schoolfriend triads from the first wave of a two-wave panel survey carried out in fall, 1971, and spring, 1972, in 18 schools on a multiphasic random sample of adolescents representative of public secondary school students in New York State. Structured, self-administered questionnaires were given in a classroom situation to the entire student body in five schools so as to collect data from the student's best schoolfriend. Two to three weeks after each school was surveyed, questionnaires were mailed to one of the student's parents, alternately mothers and fathers.

Measurement of Drug Use and Criterion Variables

The questionnaires included a wide variety of structured items about the use of legal and illegal drugs as well as personal characteristics and behaviors. In particular, adolescents were asked how many times they ever had used for nonmedical reasons each of the following substances: hard liquor, marihuana, hashish, LSD, other psychedelics, methedrine, other amphetamines, barbiturates, tranquilizers, cocaine, heroin, other opiates, and inhalants. Precoded response alternatives for hard liquor, marihuana, and hashish included: never; 1-2 times; 3-9 times; 10-39 times; 40-59 times; and 60 times and over. For the other illicit drugs, the categories included: never; 1-2 times; 3-9 times; and 10 or more times. Since best schoolfriends were sampled in the school at the same time as the focal adolescents, they answered the same questions. Parents were asked whether they ever had used any of the three major types of psychotropic drugs (the tranquilizers, the barbiturates, and the stimulants) and whether they drank hard liquor. All respondents were also asked about their use of beer or wine and cigarettes. In all instances, a category "never used" or "not used" was provided (Single, Kandel, & Faust, 1974).

In order to distinguish factors involved in different levels and different stages of involvement in illicit drug use, three measures were considered:

(a) probability of ever having used marihuana
(b) total frequency of marihuana use (respondents were scored at the midpoint of each of the precoded categories they had checked: 0, 1.5, 6, 24.5, 49.5, and 75 times)
(c) probability of use of any illicit drug other than marihuana or hashish among those who have used marihuana (multiple drug use).

Sixteen basic criterion variables were considered in relation to adolescent drug use. These variables were selected so as to represent each of the three major classes of factors referred to earlier: sociodemographic, personal, and interpersonal. Thirteen referred to personal attributes of adolescents such as school performance, religiosity, political attitudes, closeness to parents, degree of peer involvement, and depression. Two indices were constructed to measure depression and degree of peer involvement. The index of depression was the average score received on six questions about how much the adolescent had been bothered in the past year by feeling unhappy, sad, or depressed; feeling hopeless about the future; feeling too tired to do things; having trouble going to sleep or staying asleep; feeling nervous or tense; and worrying too much about things. A respondent could check "much," "somewhat," or "not at all" for each. The average scores ranged from 1 to 3. Respondents were classified into three categories: "low" depression, scores of 1.0 to 1.4; "medium" depression, scores 1.5 to 1.9; and "high" depression, 2.0 to 3.0. The index of involvement in peer activity was based on how frequently the students engaged in specific activities with their friends. The activities included frequency of dating going to parties, listening to records with friends, driving around with friends, and hanging around with a group of friends. Participation in each activity was scored 1 to 4 and could range from "rarely or never" to "1 to 3 times a month," "1 to 2 times a week," or "every day." An average score of 2 was classified as "low" involvement, scores between 2.0 and 2.5 were classified as "medium" involvement, and scores over 2.5 were considered as "high" involvement in peer activities. Three variables referred to self-reported drug use of parents or peers: parental use of hard liquor, parental use of psychoactive drugs, and friends' illicit drug use (either frequency of marihuana use or use of other illicit drugs other than marihuana, the measure of friends' use being comparable to the adolescent's own use in each analysis).

Multiple Classification Analysis

To obtain net effects for each of the criterion variables on different measures of adolescent drug use, dummy variable multiple regression analyses were conducted, specifically, multiple classification analyses (Andrews, Morgan, & Sondquist, 1969). Two sets of coefficients, expressed as deviations from the grand mean on the dependent variable for each subgroup on the independent variables, were obtained. The first set (the first column of Table 1) gives the level of the dependent variable for various subgroups of each independent variable by itself (unadjusted). In the example, a positive coefficient indicates that the subgroup in question had a rate of marihuana use above the overall average in the triad sample, and a negative coefficient indicates that the subgroup had a lower rate than the average. The second column (adjusted) indicates the level on the dependent variable for each subgroup when the confounding effects of all other variables in the table were taken into account, also expressed as deviations from the grand mean. The effect parameters can be interpreted in the same way as ordinary standardized regression coefficients.

RESULTS

Probability of Marihuana Use

Table 1 presents the results of the first regression analysis of the probability of marihuana use on the 16 different variables describing adolescents', their friends', and their parents' behaviors. In the triads, 29% of adolescents ever had used marihuana. (This represents the grand mean from which the deviations are computed.) To facilitate comparison of the relative size of standardized effects of various factors on the three different measures of adolescent drug use, the summary effects of each of the three multiple classification analyses are presented in a separate table (Table 2).

It is evident that while many factors were related to marihuana use, many of the relationships disappeared when all other factors were controlled for. Substantively, the sociodemographic characteristics examined had little effect on marihuana use, especially when the confounding effect of other variables was controlled. Personal characteristics of adolescents were somewhat more strongly related, but overall these effects were still quite modest. The single most important factor associated with marihuana use was the pattern of drug use by the best schoolfriend. Although the adjusted effects were lower in absolute terms than the unadjusted effects, the relative ordering of the independent variables in terms of their strength of effect was about the same in each case, with the exception of parental self-reported use of hard liquor. The latter ranked eighth in order of unadjusted effects but fourth in importance when other variables were controlled.

INTERPERSONAL FACTORS. The best friend's frequency of marihuana use was the single most important influence in marihuana use. Together, the 16 variables accounted for 41% of the variance in probability of marihuana use. Taken alone, friends' frequency of use accounted for 25% ($=.500^2$) of variability in adolescents' use of marihuana as compared to about 8% ($=.290^2$) for the variables next in importance, political attitude and participation in peer activities. Not only did friends' frequency of marihuana use have the strongest effect when considered alone, but it had a far stronger effect than any other variable when all other factors were considered simultaneously. These results, based on the friends' independent reports of their drug usage, confirmed findings from other studies based on perceptions (Lavenhar, et al., 1972).

TABLE 1

Probability of Marihuana Use by Selected Characteristics of Adolescents, Parents and Best Schoolfriends Expressed as Unadjusted and Adjusted Deviations from Grand Mean (=.292) and Unadjusted and Adjusted Effects (Triads - Wave 1, Fall, 1971)

Characteristic[a]	Deviations from Grand Mean[b]		
	Unadjusted (zero order)	Controlling for Other Variables	N
Friend's Self-Reported Frequency of Marihuana Use			
Never	-.15	-.10	721
1-2 times	+.22	+.16	70
3-9 times	+.18	+.12	86
10-39 times	+.41	+.29	72
40-59 times	+.43	+.28	24
60 + times	+.48	+.31	74
Effect[c]	.500	.336	
Parent's Self-Reported Liquor Use			
Never	-.13	-.08	216
Less than once a month	+.01	.00	412
1-3 times a month	-.02	-.03	179
Once a week	+.09	+.10	136
Several times a week	+.12	+.11	86
Daily	+.01	+.03	38
Effect	.175	.136	
Parent's Self-Reported Use of Psychoactive Drugs			
None	-.04	-.02	581
One	+.06	+.04	309
Two	+.04	.00	143
Three	-.06	-.04	43
Effect	.108	.059	
Index of Peer Activity			
High activity with peers	+.20	+.12	273
Medium activity with peers	+.01	-.01	348
Low activity with peers	-.12	-.06	450
Effect	.284	.158	

TABLE 1 (p. 2)

Characteristic	Deviations from Grand Mean: Unadjusted (zero order)	Deviations from Grand Mean: Controlling for Other Variables	N
Closeness to Parent			
Close to both	-.11	-.04	428
Close to one parent	-.01	-.02	319
Close to neither	+.14	+.07	312
Effect	.229	.103	
Political Attitude			
Conservative	-.14	-.08	140
Moderate	-.10	-.04	423
Liberal	+.05	+.01	285
Very liberal, radical	+.26	+.16	172
Effect	.290	.160	
Days Absent from School			
0- 2 Days	-.15	-.05	270
3- 6 Days	-.03	-.02	426
7-16+ Days	+.14	+.06	381
Effect	.248	.114	
Letter Grade			
A	-.09	-.05	238
B	-.02	-.01	566
C or below	+.13	+.07	267
Effect	.175	.094	
Educational Aspirations			
Less than college	-.02	-.04	332
College or more	+.01	+.02	741
Effect	.028	.065	
Church Attendance			
1-2 times a week or more	-.16	-.06	284
1-3 times a month	-.05	.00	186
Rarely or never	+.09	+.03	593
Effect	.235	.090	

TABLE 1 (p. 3)

Characteristic	Deviations from Grand Mean		
	Unadjusted (zero order)	Controlling for Other Variables	N
Depression Index			
High	+.06	+.01	378
Medium	-.02	.00	441
Low	-.08	-.03	243
Effect	.123	.059	
Race			
White	+.03	+.01	830
Black	+.03	+.07	21
Other	.00	+.12	26
NA	-.14	-.06	199
Effect	.153	.079	
Year in School			
Freshman	-.21	-.04	112
Sophomore	-.06	-.02	341
Junior	+.05	+.01	319
Senior	+.09	+.03	304
Effect	.204	.057	
Region			
City	+.02	-.01	299
Rural	-.15	-.04	165
Suburb	+.03	+.02	614
Effect	.138	.048	
Family Income			
10499 and below	-.06	.00	267
10500 to 14999	-.03	.00	241
15000 +	+.06	+.01	477
Effect	.114	.030	
Sex			
Male	.00	.00	453
Female	.00	.00	624
Effect	.019	.017	

Multiple R = .642 $R^2 = .41$ Total N = 1077

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[a] NA's have been excluded from the table for ease of presentation except for race where the number is much higher than for the other characteristics.

[b] The coefficients derived from dummy variable regression analysis of the probability of marihuana use on all variables presented in the table have been converted to deviations from the grand mean.

[c] Summary measure of the total effect of each variable on the probability of marihuana use. These coefficients have an interpretation analogous to that of ordinary regression coefficients (beta weights) expressed in standard form.

The causal ordering of these variables (in particular, adolescent and best friend's marihuana use) is ambiguous. Undoubtedly some individuals get pressured into using drugs because their friends are doing so, but alternatively, users may seek fellow users as friends. However, it is clear that there is a strong positive association between adolescent and best friend's use of marihuana which is relatively independent of demographic, personal, life-style, and family factors.

Table 1 confirms the cross-sectional analysis reported elsewhere (Kandel, 1973; 1974 a,b; 1975) and indicates that the number of psychoactive drugs used by the parents bore virtually no relationship to the use of marihuana by the adolescent. However, parental self-reported use of hard liquor was the fourth most influential factor when all variables were considered simultaneously. Adolescents whose parents never used hard liquor were almost 8% less likely than average to have tried marihuana, net of other factors; those whose parents used hard liquor infrequently (less than once a week) showed an average rate of use; while those whose parents used hard liquor at least once a week but less than daily were about 10% above average in their rate of use. However, at the highest levels of parental drinking, adolescents seemed to react against the example of a parent who was a heavy ("daily") drinker. In this case, students were only 3% more likely than average to use marihuana.

PERSONAL AND LIFE-STYLE VARIABLES. Personal factors included one measure of psychological state, degree of depression, and seven measures of life-style and attitudes. The unadjusted coefficients indicate that depression was somewhat related to marihuana use and that life-style characteristics, specifically liberal political attitudes, high involvement in peer activities, lack of closeness to parents, and low church attendance, were more strongly related. Except for depression, the differences continued to hold for each factor when other variables were taken into account, but the contrasts were not as sharp. Political attitudes and level of participation in peer activities were the second most influential factors behind friends' frequency of use, with drug use highest among the most radical students and those highly involved with their peers. With all other factors controlled, adolescents describing themselves as conservatives were 8% less likely than the average to use marihuana, moderate or liberal adolescents were about average in their overall rate of use, and very liberal or radical adolescents were 16% more likely to use marihuana. Adolescents with high levels of peer activity were 20% more likely than the average to be using marihuana while those with low levels were 12% less likely than the average to be using. Church attendance and closeness to parents were negatively associated with marihuana use, although these differences were quite modest. The importance of political ideology and low church attendance has also been reported by others (Johnson, 1973; Lavenhar, et al., 1972).

Two of the three school-related characteristics, school absence and school performance, were associated with the probability of adolescent marihuana use, but they well may have been consequences rather than determinants of experience with drugs. Adolescents with poor grades and those with frequent school absences were more likely to have tried marihuana than those with better grades and more regular school attendance. While disaffection with school may lead to marihuana use, an alternate interpretation is that use, particularly frequent use, leads to disinterest in school activities and to poor performance in school. Establishment of a definitive causal ordering must await analysis of the longitudinal data.

DEMOGRAPHIC FACTORS. Finally, it is clear that the demographic factors have relatively little effect on marihuana use, especially when the other factors are controlled. Sex was completely unrelated to marihuana use. Year in school had a very modest positive association with drug use, with the percentage using marihuana increasing between the freshman and the senior years. The low rate of use by freshmen was obviously related in large part to their own characteristics, since the adjusted deviation is only about one-fourth the size of the unadjusted deviation. The effect of religion was comparable to the effect of age, with adolescents having no religious affiliation and Jews reporting slightly higher rates of use.

Region was only very slightly related to marihuana use when other variables were taken into account, since the effect dropped from .138 to .048. The apparent lesser marihuana use rate of rural students disappeared almost entirely, suggesting that its unadjusted effect was due to other factors associated with rural residence (e.g., conservative attitudes, church attendance, and peer and parental usage) rather than rural residence as such. The effects of race were essentially uninterpretable since (a) many respondents did not answer the question and (b) these youths were the most distinctive in their drug behavior.

Frequency of Marihuana Use

As a refinement to the analysis, a second multiple classification analysis was carried out to examine the correlates of total frequency of marihuana use. The dependent variable was the average number of times marihuana ever had been used by adolescents as determined by the midpoint value of their precoded frequency of use category. The mean level of marihuana use for the entire sample (including users and nonusers) was 7.6 occasions. The determinants of frequency of marihuana use exhibited similar patterns to those observed with respect to the probability of marihuana use. (Summary results appear in Table 2.) With certain exceptions, the effect parameters were virtually identical, and in both cases more than one-third of the variance in the dependent variable could be attributed to the combined effects of the adolescents', parents', and peers' variables. The R^2's for probability of use and frequency of use were .41 and .40 respectively. Not only were the effect parameters highly similar, but the pattern of deviation scores were as well. The same factors which determined the probability that a student would ever have used marihuana also determined the frequency of use. Two exceptions were political attitude and parental use of hard liquor, which appeared to influence the frequency of marihuana use less than the probability of use, indicating that these factors may relate to experimentation rather than regular use of marihuana. The most important factor was a friend's frequency of marihuana use with an adjusted effect of .427 as compared to 145 for the factor next in importance, index of peer activity. Students whose friends reported having used marihuana 60 times or over reported 26 more occasions of use than the average; those whose friends never had used marihuana reported 4 fewer occasions than the average. The influence of friends relative to the effect of other factors was even stronger for frequency of marihuana use than for the probability of use.

Use of Illicit Drugs Other Than Marihuana

Summary results of a multiple classification analysis of the probability of having tried other drugs among students who had any experience with marihuana or hashish are presented in Table 2. Nearly half (48%) of the marihuana users in this sample of triads had tried other illicit drugs as well. The 16 variables explained less of the variance in the use of multiple drugs among marihuana users (30%) than these same factors explained for the probability and frequency of marihuana use (40% and 41%, respectively). The pattern of determinants of multiple drug use differed in significant ways from those of marihuana use versus nonuse or of frequency of use.

While peer behavior still showed the strongest effect of any variable on the use of other illicit drugs besides marihuana, other variables showed almost as strong an effect. Relative to their importance for marihuana use, closeness to parents and personal characteristics such as depression and school performance increased in importance for the use of other illicit drugs, while peer influence decreased. In the probability of starting to use marihuana, the (adjusted) effect of peer drug behavior was more than twice as important as the effect of political attitude, the variable next in importance (.336 versus .160). However, in the probability of using other illicit drugs once initiated into marihuana, other factors assumed almost as strong an importance as a friend's behavior. The effect of a friend's multiple drug use was .220 versus .200 for closeness to parent, the variable next in importance.

The detailed pattern of deviations is very revealing. While those whose friends had used other illicit drugs were 13% more likely to have used such drugs themselves, those

TABLE 2

Adjusted Effects of Sixteen Selected Characteristics on Probability of Adolescent Marihuana Use, Frequency of Marihuana Use, and Probability of Other Illicit Drug Use Among Marihuana Users, Based on Three Separate Multiple Classification Analyses (Triads - Wave 1, Fall, 1971)

	Adjusted Effects[a]		
Characteristic	Probability of Marihuana Use	Frequency of Marihuana Use	Probability of Use of Other Illicit Drugs
Friend's self-reported drug use	.336[c]	.427[c]	.220[d]
Parent's self-reported liquor use	.136[b]	.069[b]	.034[b]
Parent's self-reported use of psychoactive drugs	.059[b]	.055[b]	.108[b]
Index of peer activity	.158	.145	.144
Closeness to parent	.103	.100	.200
Political attitude	.160	.108	.140[b]
Days absent from school	.114	.141	.074
Letter grade	.094	.061	.182
Educational aspirations	.065	.049	.054
Church attendance	.090	.068	.140[b]
Depression index	.059	.079[b]	.152
Race	.079	.061	.054
Year in school	.057	.070[b]	.032[b]
Region	.048	.042	.076
Family income	.030	.025	.108
Sex	.017	.005	.066
Multiple R =	.642	.631	.546
R^2 =	.412	.398	.298
Total N =	(1,077)	(1,077)	(312)

[a] Summary measure of the total effect of each variable on each measure of adolescent illicit drug use. These coefficients have an interpretation analogous to that of ordinary regression coefficients (beta weights) expressed in standard form.

[b] Nonlinear effect. When the independent variable has a curvilinear relationship to drug use, the effect parameter tends to be higher than one would obtain from a standardized regression coefficient with the predictor treated as a continuous variable.

[c] Friend's use = frequency of marihuana use

[d] Friend's use = use of illicit drugs other than marihuana

whose friends used cannabis only were as unlikely as those whose friends used no illicit drugs at all to be using illicit drugs other than cannabis. This finding documents very clearly the specific influence which a friend's behavior does have.

The three factors next in importance after peer patterns of illicit drug use were degree of closeness to parents, school performance, and depression, in that order. Adolescent marihuana users who were not close to either parent, those who did badly in school, and those who felt depressed were more likely to be multiple drug users, even when other factors were controlled. The role of depression, in particular, was quite different from its lack of effect on marihuana use. However, as has already been noted, these factors may be consequences rather than causes of the drug use pattern. The political and church attendance variables, which were quite systematically related to probability of marihuana use, exhibited a complicated and seemingly inconsistent relationship to multiple drug use.

Social and demographic effects were very weak, especially once other variables were controlled; there seemed to be a slight tendency for girls to be more likely than boys to be multiple drug users. (There were no sex differences whatsoever in the probability of ever having tried marihuana.) Similarly, although suburban pupils were most likely to have used marihuana (Table 1), suburban users were slightly less likely to move on to other drugs than were city or rural users. Again, whereas marihuana use had a slight positive correlation with family income, use of illicit drugs other than marihuana had a negative correlation. In short, social characteristics are not particularly important in either case; but what effects they do have are somewhat different in accounting for the probability of trying marihuana as against the probability of a marihuana smoker trying something else as well.

The number of psychoactive drugs used by the parent had a puzzling and not readily interpretable effect on the student's pattern of use of other illicit drugs besides marihuana. Adolescents whose parents reported using two such types of drugs were less likely to be multiple drug users than those whose parents reported use of one or none. In contrast to the probability (but not the frequency) of marihuana use, parental use of hard liquor had no effect.

SUMMARY

Several conclusions are stated and explained:

(1) There are similarities but also important contrasts in the pattern of association of various factors with adolescent illicit drug use, depending upon whether or not marihuana or other illicit drugs are involved.

(2) The single most important factor associated with adolescent illicit drug use (marihuana as well as the other illicit drugs) is the pattern of drug use by the adolescent's best friend. Not only does this variable have the strongest effect when considered alone, but also, especially with respect to marihuana, it has a far stronger effect than any other variable when all other factors are considered simultaneously.

(3) The social demographic characteristics of students have relatively little effect on any type of illicit drug use, especially when the confounding effects of other variables are controlled. The personal and life-style characteristics of students such as extent of participation in peer activities, radical political orientation, or poor school performance are more strongly related to illicit drug use than are sociodemographic characteristics. Overall these effects are still quite modest and vary with the pattern of illicit drug use. The number of psychoactive drugs used by the parent bears virtually no relationship to the probability of drug use by the adolescent, but the frequency of parental use of hard liquor has a moderate, albeit slightly curvilinear, effect which remains virtually unchanged when the other variables are controlled.

(4) The predictors of frequency of marihuana use exhibit a strikingly similar pattern to that observed with respect to the probability of marihuana use.

(5) By contrast, important differences in the effects of various factors emerge in the comparison of use of marihuana with the use of more serious illicit drugs Peer influence is much more important (both in terms of the absolute size of its effect and its size relative to that of other factors) on marihuana use than on other illicit drug use. While peer behavior still shows the strongest effect of any variable in the probability of using other illicit drugs among those already initiated into marihuana use, other variables now assume almost as strong an importance. These other variables, depression and lack of closeness to parents, express lower levels of psychological functioning and disaffection from more intimate family contacts.

While this summary implies a certain causal order between the criteria variables and various forms of illicit drug use, longitudinal analyses are required to determine the extent to which these variables are determinants or consequences of use. However, it is clear that the relevance of different factors to explain illicit drug use by young people depends upon the specific type and pattern of drug use under consideration.

Cross-sectional and longitudinal analyses have documented that marihuana use and the use of other illicit drugs represent but two later stages in a sequence of patterns of drug use which begins with the legal drugs. Use of hard liquor and tobacco are part of a cumulative and hierarchical pattern of drug use which ranges from beer and wine on the one end to heroin on the other (Single, Kandel & Faust, 1974). In the total representative New York State sample of which this relational sample is a subset, only a very small percentage have used marihuana but have not used also either hard liquor (2% of all students or 8% of marihuana users) or tobacco (3% or 10%, respectively). In turn, a small group of youth have tried other illicit drugs but have not first used marihuana. Thus, marihuana use is part of a process of drug behavior in which four phases can be clearly delineated: (1) beer or wine; (2) hard liquor or tobacco; (3) marihuana; and (4) other illicit drugs (Kandel & Faust, 1975).

The identification of stages in drug behavior has important implications for studying the factors that predict, differentiate, or result from drug use. First, it draws attention to the fact that in each of the stages different types of variables and different processes may be involved (Kandel, et al., 1974). Thus, not only do different factors correlate with the use of marihuana on the one hand and with the use of other illicit drugs on the other, but also different factors correlate with the use of legal drugs (Kandel, et al., 1974). The most important factor related to adolescent use of hard liquor is degree of sociability with peers rather than the best friend's use of hard liquor. This contrasts especially with marihuana but also with other illicit drugs for which peer drug use is the single most important variable. Second, whereas most studies compare youths within a sample on the basis of their use or nonuse of a particular substance, our results suggest a different strategy. Since each stage represents a cumulative pattern of drug use and generally contains fewer adolescents than the preceding stage in the sequence, comparisons should be made among users and nonusers of the restricted group of respondents who have already used the drug(s) at the preceding stage(s). Unless this is done, the attributes identified as apparent characteristics of a particular group of drug users may actually reflect characteristics important for involvement in drugs at the preceding stage.

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